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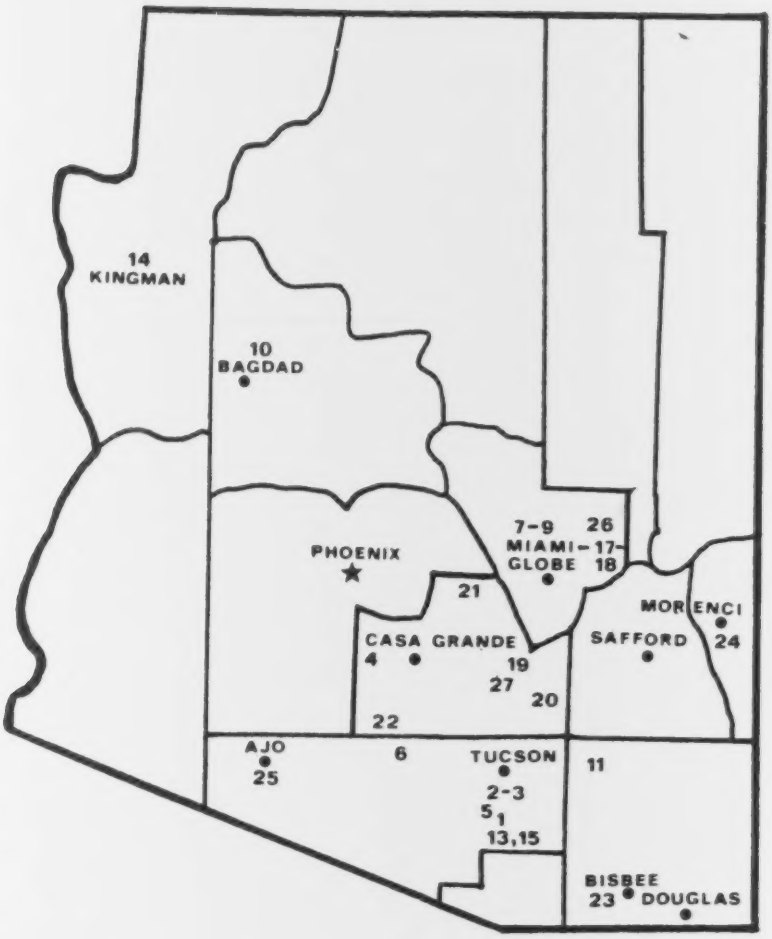
THE PRIMARY COPPER INDUSTRY OF ARIZONA IN 1982

SPECIAL REPORT NO.6



BY

CLIFFORD J. HICKS

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ACKNOWLEDGEMENT

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To John H. Jett, Director, ADMR, appreciation for the opportunity to compile data relative to Arizona's copper industry in 1982 and present it in convenient form.

ABOUT THE COVER

The producing copper mines and operations listed below correspond to the location and numbers on the cover.

COMPANY
#. Mine

ANAMAX MINING COMPANY
1. Twin Buttes
2. Eisenhower

ASARCO INCORPORATED
2. Eisenhower
3. Mission
4. Sacaton
5. San Xavier
6. Silver Bell

CITIES SERVICE COMPANY
7. Copper Cities Operations
8. Miami Mine
9. Pinto Valley

CYPRUS MINES CORP.
10. Bagdad
11. Johnson
12. Pima

DUVAL CORP.

13. Esperanza
14. Mineral Park
15. Sierrita

INSPIRATION CONSOLIDATED COPPER CO.
16. Christmas
17. Inspiration
18. Oxhide Mine

KENNECOTT CORPORATION
19. Ray

MAGMA COPPER CO.
20. San Manuel
21. Superior

NORANDA LAKESHORE MINES, INC.
22. Lakeshore

PHELPS DODGE CORP.
23. Copper Queen Branch
24. Morenci Branch
    Metcalf Mine
    Morenci Mine
25. New Cornelia

RANCHERS EXPLORATION & DEVELOPMENT CORP.
26. Bluebird
27. Old Reliable

THE PRIMARY COPPER INDUSTRY OF ARIZONA IN 1982

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BY

Clifford J. Hicks

January 1984

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1/ Throughout this report a "Ton" means a short ton (2,000 pounds or 0.907 metric ton).

INTRODUCTION

The Arizona Department of Mineral Resources presents herein a report covering activity in Arizona's Copper industry in the calendar year 1982. A brief review of operational highlights reported by the major developers and producers in the State, market and price developments which affected copper production and discussions of Arizona inventory and severance taxes on metalliferous minerals are included.

The statistical tables in this report include various production and employment figures for 1982. Production of recoverable copper is given for individual mines and by company. Figures showing the importance of copper in the state's mining industry are furnished, as are data on the by-products of copper mining; gold, silver and molybdenum. In addition, historical compilations are included for leach copper, average grade of ore produced, percent copper recovered, open pit mine stripping ratios, and employment and earnings. Additional compilations indicating refined copper inventories in and out of the United States and average copper prices by month from 1973-82 are provided. Also included are tables showing designed mine capacity and copper reserves in Arizona.

The Department maintains an extensive reference library concerning the copper industry in Arizona. This includes information on individual mines and mining companies, United States Bureau of Mines and United States Geological Survey publications, professional publications, and earlier editions of this report.

COPPER PRODUCTION IN ARIZONA--1982

Arizona, in spite of production curtailments, continued to lead the nation in the production of copper. In 1982 the state's mines produced 842,650 tons of recoverable copper, down 27% from the record 1981 production. This, however, was 67.2% of the United States total (Table XIV).

In 1982, the gross value of mineral production (excluding coal, natural gas and petroleum) in Arizona was $1,619,296,000. Of this total, copper production contributed almost 78% (Table X). Other major contributors to the total value of mineral production in the state included molybdenum, gold and silver. Virtually all the molybdenum and most gold and silver are byproducts of the treatment of copper ores (Table X). As a result, Arizona ranks second in the United States production of silver and molybdenum, and fourth in the production of gold.

Copper was produced from 21 major Arizona copper mines in 1982. Molybdenum was recovered as a by-product at 11 of the copper mines during the year (Table I). Nine mines produced 78.73% of Arizona's 1982 copper production and five mines produced 91.80% of the molybdenum. The two largest producers, Twin Buttes and Morenci, first and second respectively, accounted for more than 27% of the total copper recovered. The Sierrita mine was by far the largest producer of by-product molybdenum recovering 42.34% of the state's total (Table IV).

Copper produced by leaching methods during 1982 was 334.5 million pounds, down 5% from 1981 record production, and accounted for 19.6% of total primary production (Table II). A major addition to leach copper production was the increased output at the Lakeshore mine.

There were seven solvent extraction electrowinning operating in Arizona in 1982. Solvent extraction uses a liquid ion-exchange process to increase the copper concentration of the solution from which the copper is then recovered by electrolytic deposition. Some of the advantages of the solvent extraction process over the cementation process are: no air pollution is produced, there is a net reduction in energy costs, and the end product is high grade cathode copper which can be marketed directly.

There were thirteen open pit copper mines operating in the state in 1982. The stripping ratio, or the amount of waste removed compared to the amount of ore mined, at these operations is given for the past decade (Table IX). The low 1982 weighted average stripping ratio (1.31:1) reflects producers' efforts to reduce mining costs by stripping no more waste than necessary to maintain production. In the future stripping ratios can be expected to increase when the copper market recovers and mining operations become profitable.

Copper sulfide ores were the source of 80.4% of the copper produced in 1982. The average grade of that sulfide has trended slightly downward during the last decade (Table VII). In 1982 a ton of average ore contained 11.8 pounds of copper. That was down less than 10% from 1972 when the average ton of ore contained 12.8 pounds of copper.

Table XIII shows an estimate of the capacity to produce primary copper at each of the state's principal operations. Total estimated design capacity is 1.248 million tons annually. The Arizona mines, their concentrators and leach plant facilities, operated at 68% of estimated capacity during 1982.

Employment in Arizona's copper industry was 17,182 persons during 1982. That was a decrease of 34% from the previous year and the lowest number since 1968 (Table XV). However, worker productivity and average hourly earnings increased. The aggregate man-hours worked dropped 35%. The Arizona production worker's average hourly production of ore was 6.064 tons, 0.25 tons more than in 1981, while the average hourly production of copper was 70.44 pounds, an increase of 8.89 pounds. Earnings of the production workers rose $0.87 to an average hourly rate of $12.94, an increase of 7% (Table XVII).

Affecting production at Arizona's copper mines in 1982 were some events largely beyond the producing companies' control. The world-wide recession caused demand and prices for copper to fall. Aggravating the situation was foreign government owned CIPEC (Council of Copper Exporting Countries) producers who produced as much copper as they could, without regard for market conditions. CODELCO, the Chilean state company, for instance, increased its output by 15% to an all-time high. It then received from the International Monetary Fund compensatory financing facility $327 million to compensate for its alleged loss in export revenues because of copper's low price. United States copper producers were caught in a cost price squeeze due to their higher labor costs, lower ore grades and heavy environmental burdens. Thus, U.S. producers were forced to bear a disproportionately large share of the production curtailments.

Many factors, some of which have been discussed above, affect the actual production of copper in Arizona. Most technological factors are so interwoven that to isolate one and describe its impact is extremely difficult and often misleading. An even more difficult task is to properly evaluate the rapidly enlarging domain of economic and socio-political factors that influence daily the decisions made by the developers and producers of copper. Foremost in any discussion of capacity is the availability of the natural resource, in this case the availability of deposits of copper mineralization. A listing of most of Arizona's rich endowment of proven copper reserves is given in Table XX.

It should be emphasized that although the reserves listed in Table XX total of 9.5 billion tons of ore, the figures can move upward or downward drastically with changes in technological skills or with changes in U.S. policy or economy. If, for example, socio-political factors such as capricious rules and regulations imposed by governments become too burdensome, many of these deposits may never be developed and many existing mines may be closed. One must never lose sight of the fact that the term "ore" is not a geological or mineralogical term but purely and simply an economic term. If rock containing a marketable commodity can be mined, processed, transported and the commodity marketed <u>at a profit</u> then the rock from which the commodity was derived is <u>ore</u>, -if not, it is mineralized waste. Some copper mines have been producing and selling copper for prices under cost because it is more economical to maintain some production then to mothball the operations and lose employees.

A BRIEF REVIEW OF THE 1982 COPPER MARKET

"Free World consumption of copper weakened steadily throughout 1982. In the United States, industrial production in terms of capacity utilization declined to post-World War II lows due to the continuing economic recession. For the third consecutive year, demand for copper from the housing and automotive industries, which account for 40% of U.S. copper consumption, was at sharply reduced levels. Total U.S. consumption of copper in 1982 declined 17% from 1981".

"In response to weak demand, copper producers in the U.S. and Canada closed or curtailed many mining operations. The consequent loss of mine output in 1982 amounted to more than 600,000 tons of copper, or about 25% of normal production in these two countries. Producers in other countries, however, did not cut back. In fact, copper mine output increased in some countries where the perceived need to maintain employment and to export copper for foreign exchange out weighed market considerations. As a result, the decline in Free World copper output did not match the drop in consumption, and visible copper stocks increased by more than 300,000 tons".

"Copper prices reacted to the worsening market by falling below the already unremunerative levels of 1981. The average domestic producer price for 1982 was 72.6 cents a pound compared to 83.7 cents in 1981".

"As 1982 drew to a close, the steady decline in interest rates which had started at midyear began to stimulate improved demand for houses and automobiles, & copper prices increased slightly. Although stocks held by producers and the commodity exchanges increased significantly in 1982, they were still far below the levels reached in 1977-78. Consumer inventories were at minimum levels".

"The supply of copper in 1983 is not likely to exceed 1982 levels. Substantially higher copper prices than those prevailing at the end of 1982 will be required to restore fully the cutbacks in copper mine output which occurred in 1982 in North America and to prevent additional mine closings. Refined copper production will continue at reduced levels as the cutbacks in mine production work their way through the pipeline. Overseas producers were already producing about at capacity in 1982 and have no major new mines coming on stream in 1983".

Source: ASARCO Incorporated Annual Report 1982.

HIGHLIGHTS OF COMPANY OPERATIONS IN ARIZONA

ANAMAX MINING COMPANY

Anamax Mining Company is an equal partnership between Anaconda Minerals Company, a wholly owned subsidiary of the Atlantic Richfield Company and AMAX Incorporated. The company operates the Twin Buttes open-pit mine and controls the Palo Verde ore reserves under a lease from the State of Arizona. An agreement is in effect with ASARCO Incorporated for mining the Palo Verde deposit. Anamax is an equal partner with ASARCO in the Eisenhower Mining Company which mines the Palo Verde deposit. Anamax's share of Eisenhower ore is processed at the Twin Buttes mill.

"Under the terms of a consent order issued by the Federal Trade Commission on October 29, 1979 in an administrative proceeding in which it had challenged the acquisition of common stock of The Anaconda Company by Atlantic Richfield and the subsequent merger between the companies, the Company is required to divest most of its interest in Anamax by October 1984 and has been seeking a buyer for its interest. The company's share of the Twin Buttes and Palo Verde mines production yielded 69,600 tons of copper in 1982 and by-products of molybdenum, silver and uranium. Anamax Mining Company suspended sulfide mining at the Twin Buttes mine on January 31, 1983. The Company's (Atlantic Richfield) annual share of Anamax's copper production will be reduced by approximately 50 percent as a result of the suspension".[1/] Anamax Mining Company was the largest Arizona copper producer in 1982 raising its all-mines production by 7.5% from the 1981 figures to 290,579,000 pounds of recoverable copper. Pounds of recoverable molybdenum increased 86.8% to 4,136,000 from 1981 production making it second only to the Duval Corporation.

ASARCO INCORPORATED

ASARCO owns and operates four open pit mines in Arizona: Mission, Sacaton, San Xavier and Silver Bell. The Silver Bell mine was closed in December 1981 and remained shut down all of 1982 except for a small copper leaching operation. The Eisenhower open pit mine is operated and partially owned by ASARCO. The company's share of Eisenhower ore is processed with ore from the San Xavier and Mission mines at the Mission concentrator. Other ASARCO operations in the state include a smelter and acid plant at Hayden and the development of an underground project at Sacaton. Because of high development costs and a weak copper market work on this mine was suspended in September 1981 and remained shut down throughout 1982. For the same reason the company emphasized cost reduction throughout its organization during 1982. Through a combination of attrition and a series of layoffs, the Mission Unit (Mission, Eisenhower and San Xavier mines) reduced employment by 24%. However, copper output remained at the 1981 level by alterations in the mining plan, increased productivity and the shut down of the molybdenum plant in July because of low prices and demand.

Work is continuing on a $132.6 million project at Hayden, AZ to install a modern oxygen flash smelting furnace which is scheduled to start-up in October 1983. This will replace Hayden's two reverberatory furnaces and the roaster. Demolition of the larger reverberatory furnace was commenced in November 1982 to make room for the new oxygen furnace. Since this furnace will have a sulfur dioxide discharge gas suitable for conversion to sulfuric acid a new acid plant was substantially complete by the end of 1982. A plant to produce oxygen for the furnace was 40% complete by year-end and a facility to remove solid particles from the

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1/ Atlantic Richfield Annual Report on 10-K, 1982. pp 7-8

furnace emissions was 60% complete.

CASA GRANDE COPPER COMPANY

The Casa Grande Copper Company was formed to explore and develop the Casa Grande deposit which is four miles northwest of Casa Grande, AZ and reportedly contains 350 million tons of ore grading about one percent copper. It is equally owned by Hanna Mining Company and the Getty Oil Company. Hanna Mining is the operating partner.

Operations were suspended in 1981 reflecting the recession and the worsening copper market. When work is resumed, a pilot program will be undertaken to provide data for further engineering and feasibility studies.

Development of the ore body could require an investment of at least $400 million.

CITIES SERVICE COMPANY

On December 1, 1982 Newmont Mining Corporation agreed to purchase Cities Service Company's Miami Copper operations, 80 miles east of Phoenix and includes the Pinto Valley open pit mine, The Miami East underground development, and two solvent extraction-electrowinning plants. The company's new name became the Pinto Valley Copper Corporation and its largest producer has been the Pinto Valley openpit mine where copper ore is treated at a sulfide concentrator. Dump leaching is done at the Copper Cities mine and in-place leaching at the closed underground Miami mine. The Copper Cities precipitation plant shutdown June 1, 1982 and the Pinto Valley mine and mill on June 29, 1982. Development work at the Miami East ceased on June 27, 1982. Concentrates from the former Cities Service properties have provided 70% of the feed for the Inspiration Consolidated Copper Co's smelter. This contract will expire in the third quarter of 1984 when the Pinto Valley Copper Corp. concentrates will be smelted by Newmont's Magma Copper Company unit at San Manuel.

Because of shut downs total production of pounds recoverable copper dropped from 184,458,000 in 1981 to 113,685,000 in 1982.

CYPRUS MINES CORPORATION

Cyprus Mines Corporation is a wholly owned subsidiary of the Standard Oil Company of Indiana. Cyprus' operations include the Bagdad and Johnson open pit operations and the Cyprus Metallurgical Processes Corporation in Tucson.

During 1981 Cyprus Mines Corporation acquired Union Oil's 25% interest in the Pima Mine. Cyprus Mines now owns 75.01% of Pima with Utah International (wholly owned by the General Electric Company) remaining the sole non-operating partner with a 24.99% share.

Depressed metals prices resulted in production cutbacks in Arizona copper mines in 1982. All mining and milling operations were halted October 1, 1982 at Cyprus Pima. Equipment was mothballed to permit reopening when conditions get better.

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Cyprus Bagdad, the corporations' largest copper mine, instituted cost control measures including a reduction in stripping operations together with a production cutback of 10% for the last half of 1982. Additionally a wage and hiring freeze was instituted.

DUVAL CORPORATION

Duval is a wholly owned subsidiary of the Pennzoil Company. Duval's operation consists of the Esperanza and Mineral Park open-pit mines, concentrators and precipitation plants, the Sierrita open-pit mine and concentrator, a ferro-molybdenum plant at Esperanza and the CLEAR (Copper Leach, Electrolysis and Regeneration plant adjacent to Sierrita which utilizes non-polluting hydro-metallurgical technology to turn copper concentrate into high grade crystals (equivalent to a high-grade blister copper) electrolytically. In 1982 Duval began installing some uniquely designed low-energy electrolytic cells at the CLEAR facility which promise to save energy, cut maintenance costs and improve purity of the finished product.

During 1982 Duval's two smallest copper/molybdenum mines (Esperanza and Mineral Park) were closed and produced only precipitate copper. Sierrita which had been shut down since December 14, 1981 was reopened April 1, 1982 at reduced production rates and with a greatly reduced work force.

An innovative movable ore crushing and conveying system was developed and started up at the end of 1981 at the Sierrita property. The system, which is the United State's first large-capacity movable crushing system, can be moved to various sites within the pit by a track-type transporter as mining progresses. Crushed ore is then carried out of the mine by a conveyor system rather than trucks, resulting in a reduction in cost.

EISENHOWER MINING COMPANY

The Anamax Mining Company and ASARCO Incorporated are equal partners in the Eisenhower Mining Company which was formed to develop the Palo Verde deposit. Mining of the deposit under the joint venture agreement is expected to reduce operating costs greatly for both companies and to lengthen the life of the Mission and San Xavier mines significantly by eliminating some pit slopes and recovering ore that would ordinarily have to be left along property lines. The agreement contains provisions governing the amount of ore each partner will receive, the timing of ore delivery, and allocation of costs between the partners.

ASARCO is the mine operator and its share of the ore is processed into concentrates at the Mission mill. Anamax's share of ore is crushed near the mine and sent 6¼ miles on a conveyor to be processed at the Twin Buttes mill. During 1982 Anamax received 4,683,000 tons of copper ore from Eisenhower and produced 27,218 tons of copper. Operator ASARCO received 2,122,800 tons of copper ore from Eisenhower from which it recovered 13,786 tons of copper.

INSPIRATION CONSOLIDATED COPPER COMPANY

The financial lineage of the Inspiration Consolidated Copper Company is somewhat complex. To quote from the proxy statement and information circular for the annual and special meeting of shareholders of the Hudson Bay Mining and Smelting Co., Ltd. (HBMS) held June 8, 1983 in Toronto, Ontario, Canada: "At the present time HBMS' significant interests consist of its Canadian Metals division and its 50% interests in Inspiration Resources which is headquartered in the United States, and Trend, which has operations in the United States and Indonesia. Inspiration Resources owns all the common shares of Inspiration Coal, Inspiration Copper (author's underscore) and Terra which operate in the United States. Minorco (Minerals and Resources Corporation Limited) owns the remaining 50% of both Inspiration Resources and Trend, and also owns, through Mincan (Minorco Canada Limited), approximately 44% of HBMS". A structural reorganization is contemplated in the near future.

The company's operations in the Miami area include the Inspiration area open-pit mine (Joe Bush, Live Oak, Red Hill and Thornton), a concentrator, a ferric cure leaching solvent extraction electrowinning plant, the Ox Hide mine's precipitation plant, the Inspiration smelter and acid plant. Operations at the Christmas mine which includes an open-pit mine and concentrator closed January 2, 1982 for an indefinite period. The mine, which had employed 250, had reopened in 1979 after being closed for two years.

"Production of copper from Inspiration Copper's mines decreased marginally from 125.9 million pounds in 1981 to 123.9 million pounds in 1982. This comparable production was achieved despite the closure of the Christmas Mine, which produced 17.8 million pounds in 1981. Considerable improvement was achieved in reducing unit costs per pound of copper produced due to a combination of increases in productivity, reduction in the wage and salary work force and decreased consumption materials. Increases in depreciation charges and interest expense partially offset the effect of these cost reductions".1/

Additionally Inspiration Copper added an on-line computer system which will be useful in improving management access to needed information and accounting methods. Also, the engineering, maintenance and construction supervision have been consolidated into one department to improve efficiency.

KENNECOTT MINERALS COMPANY

In 1981 the Kennecott Corporation became a wholly owned subsidiary of the Standard Oil Company of Ohio (Sohio). Sohio, in turn, is 53% owned by a subsidiary of the British Petroleum Company.

The Ray Mines Division (Arizona) of Kennecott includes an open-pit mine, a sulfide concentrator, a solvent extraction-electrowinning plant, a dump leaching operation and precipitation plant, a pyrometallurgical smelter and a sulfuric acid plant. Mining at the Ray Mines Div., was suspended May 2, 1982 and remained shut down the remainder of the year.

"Chino Mines, A Kennecott-Mitsubishi partnership in New Mexico and Ray Mines in Arizona, each with about 50% of Bingham's (Kennecott's huge Bingham Canyon Mine near Salt Lake City, Utah) capacity, rank fifth and sixth, respectively, among domestic copper mines. Production capability from these three mines make Kennecott the largest copper producer in the United States and the fourth largest in the free world". 2/

-continued-

1/ Hudson Bay Mining & Smelting 1982 Annual Report p 8
2/ Sohio Annual Report, 1982, pp. 27-28

"Kennecott responded in several ways to the deteriorating market conditions. In March (1982) the company changed its copper pricing terms from a Comex-based price to a posted list price to improve its market flexibility. Costs were decreased at all of the company's operations, with proportionate work force reductions among salaried and hourly employees. In addition, the pay of salaried employees was reduced by 10%." 1/

MAGMA COPPER COMPANY

Magma is a wholly owned subsidiary of Newmont Mining Corporation. Magma operates two underground mines, San Manuel and Superior, with a concentrator at each. Also located at San Manuel are a smelter, a sulfuric acid plant, an electrolytic refinery and a continuous rod casting plant. These facilities operated at a reduced rate in 1982.

Magma suffered continuing losses in 1982. In view of depressed metal prices and low demand the company, in March 1982 reduced production at San Manuel to about 55,000 tons of ore per day and mine development was cut back. Both the Superior and San Manuel had work week reductions. "On April 14, 330 salaried and hourly rated employees at the San Manuel Division were laid off, and later in the second quarter, approximately 650 additional employees were laid off. On August 15, the higher cost Superior Division operations were suspended, and the mine was placed on an indefinite standby basis, resulting in the layoff of approximately 1,250 employees. By year end, approximately 2,400 of the 6,100 employees normally employed by Magma Copper Company were on layoff". 2/

"At the San Manuel Division, the mine produced 18,204,000 tons of ore at an average grade of 0.66 percent copper, compared with 22,198,000 tons with somewhat lower grade in 1981". 3/

"The Superior Mine produced 638,889 tons of ore at an average grade of 4.32 percent copper prior to the suspension of operations in August, as compared with 1,022,000 tons with a somewhat higher grade in 1981". 4/

"Year end inventories of saleable copper were 41 million pounds, compared with 32 million pounds at the end of 1981". 5/

Development work on the Kalamazoo project was suspended in late 1981. This ore body is adjacent to and deeper than the San Manuel deposit.

NORANDA LAKESHORE MINES, INC.

Noranda Lakeshore Mines, Inc., is a wholly owned subsidiary of Noranda Mines Ltd., of Canada. The mine is located 28 miles southwest of Casa Grande, Pinal County, on the Papago Indian Reservation. All underground development was suspended in April 1982. Two hundred employees were laid off at that time. The oxide ore body was the production zone. Noranda Lakeshore Mine treated 1,668,000 tons of

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1/ Sohio Annual Report, 1982, pp. 27-28
2-5/ Newmont Mining Corporation Annual Report, 1982. p. 10

ore and recovered 22,800 tons of cathode copper in 1982 as compared with 1981 production of 1,767,000 tons of ore and 13,035 tons of copper. A surface vat leach and solvent extraction-electrowinning plant recovered the copper.

"A successful test program resulted in the development and construction of a full scale in-situ leach facility designed to extract copper from the broken low grade oxide ore remaining from the mined out block cave operation. Construction and equipment installation are complete and solutions will be introduced in early 1983 when sufficient injection holes have been drilled".1/ Old workings on the 1100 level and below were prepared for the initial leaching. Two 900 horse-power pumps were installed to transfer solutions from collection sumps and dams to the surface for distribution to the SX-EW plant.

PHELPS DODGE CORPORATION

Phelps Dodge has five operating units in Arizona: 1. The Morenci Branch includes the Metcalf and Morenci open-pit mines and concentrators, a dump leaching and precipitation plant, the Morenci smelter and acid plant. 2. The New Cornelia Branch (Ajo) includes an open-pit mine, a concentrator, a smelter and acid plant. 3. The Copper Queen Branch at Bisbee consists of leaching activities at the Lavender Pit, underground mines and dumps, and a precipitation plant. 4. The Douglas Reduction Works operates a smelter with a rated capacity of 700,000 tons per year of input material. 5. The Safford Branch is developing an underground mine ten miles north of Safford.

As a result of the recession, all Phelps Dodge copper mines, concentrators and smelters (except the Hidalgo, New Mexico smelter) were closed in April 1982. The largest of the copper production facilities---Morenci---resumed operations in October "--mining at the Metcalf pit, which had been suspended at the end of 1980, was resumed to exploit a substantial tonnage of ore that could be mined with a lower waste stripping ratio than usual. When mining of that ore has been completed, operations in the Metcalf pit will be suspended again, probably until 1988, and both the Metcalf and Morenci concentrators will be supplied solely from the Morenci pit." 2/

New 1000-cubic foot flotation cells were continued to be installed at the Morenci concentrator in 1982 to replace the smaller older cells. The Ajo concentrator received similar cells during 1982 but on a more limited basis. The larger cells are more efficient and improve copper recovery and lower unit production costs.

The Copper Queen branch at Bisbee recovered minor amounts of precipitate copper by leaching some low-grade dumps at the permanently shut-down Lavender Pit mine.

During 1982, production at the Douglas smelter was intermittent and greatly under rated capacity. It ceased operations in April along with the rest of Phelps Dodge operations but resumed operation on a reduced basis in mid-July

-continued-

1/ Noranda Annual Report 1982

2/ Phelps Dodge 1982 Annual Report. p. 5

and again shut down in early November, because its principal source of concentrates, the Cyprus Pima mine, suspended production in September. The Morenci smelter resumed production in mid-October after the reopening of the mine.

"The company suffered a net loss of $74.4 million in 1982. the first loss incurred since the depression years of 1932 and 1933. With the shutdown of the Phelps Dodge Arizona operations during most of 1982, the company's total production in the State dropped to 126,800 tons of copper, as compared with 233,800 tons in 1981 and 176,500 tons during strike-ridden 1980". 1/

RANCHERS EXPLORATION AND DEVELOPMENT CORPORATION

The Bluebird mine, located a few miles west of Miami, Gila County, Arizona is owned and operated by Ranchers Exploration and Development Corporation. This open-pit copper mine suspended active excavation in July 1981, but some copper was recovered in 1982 by the sulfuric acid leaching of pre-existing oxide ore heaps and running the pregnant solutions through a solvent extraction-electrowinning plant. In October 1982 the leaching operation was placed on standby.

For the future, Ranchers is considering converting the Bluebird mine to an in-situ leaching operation when metal prices and market demands permit. The approach under consideration would involve hydraulic fracturing of the deposit, in place leaching with sulfuric acid, collecting the copper bearing liquid in bore holes and pumping it to the existing solvent extraction-electrowinning plant for cathode production. A pilot operation would be required first and full scale production would probably not occur before 1984.

1/ U.S. Bureau of Mines draft copy of the 1982 Minerals Yearbook chapter for Arizona p. 34

SEVERANCE TAX ON METALLIFEROUS MINERALS

BACKGROUND

Laws of 1982, Chapter 230 repealed the tax on sales of metalliferous minerals and enacted a severance tax in its place. Under the provisions of the severance tax, metalliferous minerals were to be taxed at the time of production, not at the time of sale. All metalliferous minerals produced after 1982 were to be taxed on the greater of the following two values:

1. The "weighted mineral value" which is essentially the cost of extracting the minerals from the earth and delivering them to the site where they will be processed, or

2. A specified percentage of the old sales tax base.

The severance tax was to be levied on metalliferous minerals at a rate of 2-1/2 percent. Unless otherwise provided by law, the tax was to be administered in the same manner as the sales tax. As a result, severance tax payments were due on the first day of the second month following the month in which the tax accrued. From January 1, 1983 through June 30, 1983, 40 percent of the severance tax was to be distributed in the same manner as the transaction privilege tax (i.e. 25 percent to the cities, 33.6 percent to the counties and 41.4 percent to the state). In subsequent fiscal years, a progressively larger share of the severance tax was to be distributed in the same manner as the transaction privilege tax. The balance of severance tax collections, after making this distribution, was to be deposited each year in the state's general fund. (effective from and after December 31, 1982)

Laws of 1983, Chapter 4 changed the due date for payment of the Severance Tax to the twentieth day of the month following the month in which the tax accrues. Taxes were to be deliquent if not received by the Department of Revenue on the day preceding the last day of the month in which they were due. (effective April 1, 1983) The law also changed the interest rate on deliquent tax payments to equal the rate established by Section 6621 of the Internal Revenue Code, compounded annually. (effective February 11, 1983)

LEGAL CITATION

A.R.S. 42-1461 - 42-1466

PAID BY

Persons engaged in the business of extracting substances from the earth that become metalliferous mineral (A.R.S. 42-1462, 42-1461).

EXEMPTIONS

None.

Severance Tax on Metalliferous Minerals (Continued)

TAX BASE

The severance tax is levied on the "net severance base" of all metalliferous minerals produced after 1982. (42-1462) The "net severance base" is the greater of the following two values (42-1464, Laws of 1982, Chapter 230, Section 12):

1. The "weighted mineral value", or

2. A specified percentage of the old sales tax base (the gross value of production less out-of-state processing costs). This value will be referred to as the "Arizona value" after June 30, 1985.

The "weighted mineral value" is essentially the cost of extracting the minerals from the earth and delivering them to the site where they will be processed. The "weighted mineral value" is determined using the following formula (42-1464)

$$\text{weighted mineral value} = \frac{\text{mining costs}}{\text{total production costs}} \times \text{gross value of production}$$

where:

mining costs represent the cost of extracting the minerals from the earth and delivering them to the site where they will be processed further (42-1461).

total production costs include most of the major costs incurred in mining and processing minerals until the point of sale (42-1461).

gross value of production is determined by multiplying the recoverable units of a metallic product by the per unit price of the product; the price per unit does not include the cost of manufacturing, fabricating or otherwise transforming a refined mineral product, when these activities occur prior to sale of the product (42-1461).

Although metalliferous minerals will no longer be taxed on the old sales tax base, the value of minerals produced after 1982 may not fall below a specified percentage of the old tax value. (42-1464, Laws of 1982, Chapter 230, Section 12) The old tax value included not only the cost of extracting the minerals from the earth, but most of the major in-state costs of producing the minerals. This value was determined by multiplying the recoverable units of a metallic product by the per unit price and deducting the out-of-state processing costs from the result. (42-1464; Laws of 1982, Chapter 230, Section 12; 41-1461) The table below shows the minimum percentage of the old tax value that may be assigned to minerals for severance tax purposes. (42-1464; Laws of 1982, Chapter 230, Section 12):

period during which minerals are produced	minimum value of minerals for purposes of determining the severance tax
January 1, 1983 - June 30, 1983	100% of the old taxable sale value
July 1, 1983 - June 30, 1984	83-1/3% of the old taxable sale value
July 1, 1984 - June 30, 1985	66-2/3% of the old taxable sale value
July 1, 1985 and thereafter	50% of the old taxable sale value

Severance Tax on Metalliferous Minerals (Continued)

TAX RATE

During fiscal years 1980-81, 1981-82 and 1982-83, businesses that produced mineral products were permitted to claim a tax credit against the Special Excise Tax for Education. The tax credit was determined by formula (see "TAX CREDIT" under "SPECIAL EXCISE TAX FOR EDUCATION"). The tax credit could not exceed the taxpayer's Special Excise Tax liability for the year. However, if a taxpayer had an unused amount of credit for any year in which his production was curtailed due to economic conditions, the unused credit could be carried forward for a period not to exceed three years. Since the Special Excise Tax does not apply to metalliferous minerals after December 31, 1982, businesses that produce metalliferous minerals are authorized to claim this tax credit against their severance tax liability, beginning in 1983. In 1982-83, the amount of credit claimed may not exceed 40 percent of the taxpayer's severance tax liability. (Laws of 1982, Chapter 228, Section 2; Laws of 1982, Chapter 230, Section 15)

DUE DATE

Collections from the severance tax on metalliferous minerals are due on the twentieth day of the month following the month in which the tax accrues. Taxes are deliquent if they are not received by the Department of Revenue on the day preceding the last day of the month in which they are due. The due date may be extended by the Department of Revenue for good cause, but not beyond the first day of the third month following the regular due date. (42-1465, 42-1322)

COLLECTING AGENCY

Department of Revenue. (42-1462, 42-101)

DEDICATION OR PURPOSE

To aid in defraying the necessary and ordinary expenses of the state, cities, and counties, to reduce or eliminate the annual tax levy on property for state, city and county purposes and to reduce the levy on property for public school education. (Laws of 1982, Chapter 230, Section 17)

YIELD

No monies will be collected from this tax until fiscal year 1982-83.

DISTRIBUTION

Each year, a portion of severance tax collections will be distributed in the same manner as the transaction privilege tax (i.e. 25 percent to the cities, 33.6 percent to the counties and 41.4 percent to the state). The portion of collections that is distributed in this manner will increase each fiscal year until 1986-87. The table below shows the amount of severance tax collections that will be distributed in the same manner as transaction privilege taxes during each fiscal year. (42-1465, Laws of 1982, Chapter 230, Section 15)

Severance Tax on Metalliferous Minerals (Continued)

period during which collections are received	portion of severance tax collections distributed in the same manner as the transaction privilege tax
January 1, 1983 - June 30, 1983	40%
July 1, 1983 - June 30, 1984	48%
July 1, 1984 - June 30, 1985	60%
July 1, 1985 and thereafter	80%

After making this distribution, the balance of severance tax collections will be deposited each year in the state's general fund and is appropriatied for public educational purposes. (42-1465; Laws of 1982, Chapter 230, Section 16)

Source: State of Arizona Tax Handbook - 1983
Prepared by the Staff of the Joint Legislative Budget Committee

INVENTORY TAX ON METALLIFEROUS MINERALS

BACKGROUND

Laws of 1982, Chapter 230, Section 13 established an inventory tax on metalliferous minerals. The tax was to be imposed on each producer's 1982 year end inventory of mined metallic products. In determing the tax, producers were allowed to deduct the value of any inventory which had previously been taxed or was exempt from taxation under the sales tax laws of this state. The inventory tax was to be levied at a rate of 1-1/2 percent and was payable in twelve equal monthly installments. The first installment was to be paid to the Department of Revenue on or before March 6, 1983. Taxpayers who were not mining in January of 1983 could be granted a one month extension for each month after December that the mine did not produce. The due date for the first monthly installment could not, however, be extended for more than six months. Under the provisions of this law, 40 percent of collections from the inventory tax was to be distributed in the same manner as the transaction privilege tax. The remaining collections were deposited directly into the general fund. (effective from and after December 31, 1982)

LEGAL CITATION

See Session Laws of 1982, Chapter 230, Section 13.

PAID BY

Persons engaged in the business of extracting substances from the earth that become metalliferous minerals (Laws of 1982, Chapter 230, Section 13, 42-1461).

EXEMPTIONS

None.

TAX BASE

The Inventory Tax is levied on the "net severance base" of the 1982 year-end inventory of all metalliferous minerals in this state. The net severance base is determined as follows:

1. Calculate the gross value of production for all metallic products in the 1982 year-end inventory. The gross value of production is determined by multiplying the recoverable units of a metallic product by the per unit price of the product; the price per unit does not include the cost of manufacturing, fabricating or otherwise transforming a refined mineral product, when these activities occur prior to sale of the product.

2. Subtract the out-of-state processing costs from the gross value of production for all metallic products in the 1982 year-end inventory. Out-of-state processing costs means processing costs incurred by the taxpayer out of this state, including freight charges for shipping metallic products out of state.

Inventory Tax on Metalliferous Minerals (Continued)

3. From the difference determined in step #2, deduct the value of metallic products that were previously taxed or were exempt from taxation under the sales tax laws of this state.

(Laws of 1982, Chapter 230, Section 13; 42-1461)

TAX RATE

Two and one-half percent of the net severance base. (Laws of 1982, Chapter 230, Section 13)

TAX CREDIT

During fiscal years 1980-81, 1981-82 and 1982-83, businesses that produced mineral products were permitted to claim a tax credit against the Special Excise Tax for Education. The tax credit was determined by formula (see "TAX CREDIT" under "SPECIAL EXCISE TAX FOR EDUCATION"). Since the Special Excise Tax does not apply to metalliferous minerals after December 31, 1982, businesses that produce metalliferous minerals are authorized to claim this tax credit against their inventory tax liability, for the remainder of the 1982-83 fiscal year. The amount claimed may not exceed 40 percent of the taxpayer's inventory tax liability. (Laws of 1982, Chapter 230, Section 15)

DUE DATE

Collections from the inventory tax on metalliferous minerals are payable in twelve equal monthly installments, with the first installment due on or before March 6, 1983. If a taxpayer was not mining in the month of January 1983, the Department is required to grant a one month extension of the date when the first monthly installment is due. For each subsequent consecutive month that a taxpayer does not mine, the Department is required to grant an additional one month extension. In no event shall the due date for the first monthly installment be extended for more than six months. (Laws of 1982, Chapter 230, Section 13)

COLLECTING AGENCY

Department of Revenue. (Laws of 1982, Chapter 230, Section 13)

DEDICATION OR PURPOSE

To aid in defraying the necessary and ordinary expenses of the state, cities and counties, to reduce or eliminate the annual tax levy on property for state, city and county purposes and to reduce the levy on property for public school education. (Laws of 1982, Chapter 230, Section 17)

YIELD

No monies will be collected from this tax until fiscal year 1982-83.

DISTRIBUTION

Of the total amount collected from the inventory tax on metalliferous minerals, 40 percent is to be distributed in the same manner as the transaction privilege tax and the balance is to be deposited in the state general fund. (Laws of 1982, Chapter 230, Section 16)

Source: State of Arizona Tax Handbook - 1983
Prepared by the Staff of the Joint Legislative Budget Committee

TABLE I

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1982

COMPANY/MINE	TONS COPPER ORE MINED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS OF WASTE/OVERBURDEN REMOVED
ANAMAX MINING COMPANY				
Eisenhower (Anamax Share)	4,683,000	54,436,000	715,000	-
Twin Buttes	11,619,000	175,347,000	3,421,000	23,811,000
Cathode Copper	3,680,000	60,796,000	-	-
Total	19,982,000	290,579,000	4,136,000	23,811,000
ASARCO INC.				
Eisenhower (ASARCO Share)	2,122,800	27,572,622	52,097	4,561,800
Mission	5,324,900	67,644,812	151,432	8,610,400
Sacaton	4,165,040	41,783,875	-	2,906,400
San Xavier	2,516,900	26,608,061	30,143	7,288,500
Silver Bell	-	-	-	-
Precipitate Cu	-	8,687,161	-	-
Total	14,129,640	171,296,531	233,672	23,367,100
CITIES SERVICE COMPANY				
Copper Cities				
Precipitate Cu	-	2,045,544 3/	-	-
Miami				
Cathode Cu	-	10,301,138	-	-
Pinto Valley	9,698,930	84,691,412	804,886	17,418,310
Cathode Cu 4/	-	16,657,487	-	-
Total	9,698,930	113,695,581	804,886	17,418,310

TABLE I
Cont.

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1982

COMPANY/MINE	TONS COPPER ORE MINED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS OF WASTE/OVERBURDEN REMOVED
CYPRUS MINES CORPORATION				
Bagdad	19,255,000	160,073,000	3,281,000	27,926,000
Cathode Cu	-	13,173,000	-	-
Johnson	1,894,700	12,213,144	-	-
Cathode Cu	-	(9,702,272) 5/	-	NR
Pima	5,101,599 2/	43,400,609	393,432	7,251,304
Total	26,251,299	228,859,753	3,674,432	35,177,304
DUVAL CORPORATION				
Esperanza	-	-	-	411,748
Precipitate Cu	-	9,354,420	-	-
Mineral Park	-	-	-	-
Precipitate Cu	-	3,190,652	-	-
Sierrita	17,793,112	104,537,351	9,674,562	9,786,949
Total	17,793,112	117,082,423	9,674,562	10,198,697
INSPIRATION CONSOLIDATED COPPER CO.				
Christmas 6/	0	0	0	0
Inspiration	15,455,400	0	0	21,871,700
Cathode Cu	-	122,320,949	0	
Ox Hide	0	0	0	0
Precipitate Cu	-	1,572,181	0	0
Total	15,455,400	123,893,130	0	21,871,700

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

COMPANY/MINE	TONS COPPER ORE MINED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS OF WASTE/OVERBURDEN REMOVED
KENNECOTT CORPORATION				
Ray 8/	4,786,864	76,819,195	46,130	11,014,740
Precipitate Cu	-	22,419,606	-	-
Total	4,786,864	99,238,801	46,130	11,014,740
MAGMA COPPER COMPANY				
San Manuel	18,204,100	213,482,000	3,792,842	NR
Superior 1/	638,899	51,265,000	-	NR
Total	18,842,999	264,747,000	3,792,842	NR
NORANDA LAKESHORE MINES INC.				
Lakeshore				
Cathode Cu	1,622,409	45,610,799	NR	NR
Total	1,622,409	45,610,799	NR	NR
PHELPS DODGE CORPORATION				
Copper Queen Branch				
Precipitate Cu	-	4,545,469	-	-
Metcalf	-	-	-	-
Morenci	15,508,773	151,472,513	331,389	12,266,373
Precipitate Cu	-	75,734,992	-	-
New Cornelia	2,053,444	21,255,782	153,639	2,493,636
Precipitate Cu	-	661,131	-	-
Total	17,562,217	253,669,887	485,028	14,760,009

-continued-

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

COMPANY/MINE	TONS COPPER ORE MINED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS OF WASTE/OVERBURDEN REMOVED
RANCHERS EXPLORATION & DEVELOPMENT CORPORATION				
Bluebird				
Cathode Cu	NR	NR	NR	NR
Old Reliable 7/	-	-	-	-
Total	NR	NR	NR	NR
TOTAL LARGE COMPANIES	146,124,870	1,708,672,905	22,847,552	157,618,960

FOOTNOTES:

NR Not Reported

1/ The Superior Division suspended operations on August 15, 1982

2/ Tons copper ore mine - 3,669,923 from pit and 1,431,676 from stockpile. All mining suspended Oct. 1, 1982

3/ Copper Cities precipitation plant shutdown June 1, 1982.

4/ Pinto Valley Mine and mill shutdown June 28, 1982.

5/ Cathode Copper. Figure included in pounds recoverable copper.

6/ Closed January 2, 1982.

7/ Permanently closed 5/15/81.

8/ Mining at Ray Mines Division at Hayden closed May 2, 1982.

Source: Author's correspondence with individual company spokesmen.

TABLE II
ARIZONA LEACH COPPER PRODUCTION 1/

(Thousand Pounds)

MINE OPERATION	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
ANAMAX MINING COMPANY										
Twin Buttes	--	--	13,462	57,925	68,772	71,614	70,343	63,719	67,922	60,796
ASARCO INCORPORATED										
San Xavier 2/	4,955	11,762	19,384	22,772	12,860	15,183	--	--	--	--
Silver Bell	8,092	7,860	8,497	8,627	5,012	6,267	6,980	4,423	7,950	8,687
BIG HOLE MINING CO.										
United Verde	214	44	32	--	--	--	--	--	--	--
CITIES SERVICE COMPANY										
Copper Cities	4,570	3,295	3,562	3,370	3,346	3,806	4,351	3,984	3,622	2,046
Miami	11,988	11,969	13,076	13,509	11,732	11,703	12,636	11,184	10,217	10,301
Pinto Valley	--	--	--	--	--	--	--	--	5,519	16,657
CYPRUS MINES CORP.										
Bagdad	14,267	13,508	14,321	14,606	15,011	14,097	14,337	12,668	13,244	13,173
Johnson	--	--	6,143	10,060	10,327	10,205	10,032	10,302	10,693	9,702
DUVAL CORPORATION										
Esperanza	2,268	1,817	3,960	6,412	8,636	7,469	6,002	9,991	11,566	9,354
Mineral Park	6,431	6,801	6,915	6,817	5,260	4,813	3,348	3,690	4,194	3,191
EL PASO NATURAL GAS										
Emerald Isle	2,180	--	--	--	--	--	--	--	--	--
INSPIRATION CONSOLIDATED COPPER COMPANY										(Est.)
Inspiration	50,401	47,765	52,470	45,545	20,883	35,945	16,638	28,958	50,532	50,000
Ox Hide	8,950	9,679	10,107	7,915	4,639	4,147	1,178	1,015	761	1,572

TABLE II
ARIZONA LEACH COPPER PRODUCTION 1/
(Thousand Pounds)

MINE OPERATION	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
KENNECOTT CORPORATION										
Ray 3/	28,369	25,478	24,338	24,374	24,334	25,013	26,502	25,875	25,788	22,420
MCALESTER FUEL COMPANY										
Zonia	2,991	2,717	619	--	--	--	--	--	--	--
NORANDA LAKESHORE MINES INC.										
Lakeshore	--	--	--	28,407	25,031	--	--	--	26,071	45,611
PHELPS DODGE CORPORATION										
Copper Queen Branch 4/	8,532	6,402	8,377	7,893	8,526	7,932	7,316	6,052	4,600	4,545
Morenci Branch	25,668	22,704	23,778	53,136	41,545	51,362	93,983	86,840	96,090	75,735
New Cornelia Branch	--	--	--	--	--	--	--	--	--	661
RANCHERS EXPLORATION & DEVELOPMENT CORPORATION										
Bluebird	15,005	15,344	15,122	17,876	17,069	3,926	10,955	13,017	13,328	NR
Old Reliable	5,992	2,175	467	--	--	--	1,005	1,128	149	--
TOTALS	200,873	189,320	224,630	329,244	282,983	283,482	285,606	282,846	352,246	334,451
PERCENT OF PRIMARY COPPER PRODUCED 5/, 6/	10.8	11.0	13.8	16.1	15.3	13.9	13.3	16.4	15.0	19.6

Source: Arizona Department of Mineral Resources; This report, Table II

1/ Copper recovered from precipitate and/or by solvent extraction from material dump, heap, vat or in-situ leached.
2/ San Xavier discontinued production of siliceous flux and commenced production of copper precipitate as of 5/1/73.
3/ Includes only copper contained in precipitates from dump leaching. Does not include copper production by electro-winning.
4/ Lavender Pit and Copper Queen Mine.
5/ Leach copper compared to total copper produced from all primary sources as reported in "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines for 1973-1978.
6/ Leach copper compared to total copper produced as reported in Table IIfor 1979-1982.

TABLE III

RANK OF ARIZONA'S COPPER COMPANIES

BY PRODUCTION OF COPPER AND MOLYBDENUM

1982

Copper			Molybdenum		
Rank	Company	% of AZ Production	Rank	Company	% of AZ Production
1	Anamax Mining Company	17.05	1	Duval Corp.	42.37
2	Magma Copper Company	15.52	2	Anamax Mining Company	18.11
3	Phelps Dodge Corp.	14.88	3	Magma Copper Company	16.56
4	Cyprus Mines Corp.	13.24	4	Cyprus Mines Corp.	16.09
5	ASARCO Inc.	10.02	5	Cities Service Company	3.52
6	Inspiration Cons. Copper Company	7.26	6	Phelps Dodge Corp.	2.12
7	Duval Corp.	6.85	7	ASARCO Inc.	1.02
8	Cities Service Co.	6.68	8	Kennecott Corp.	0.20
9	Kennecott Corp.	5.80			
10	Noranda Lakeshore Mines Inc.	2.69			

TABLE IV
RANK OF ARIZONA'S COPPER MINES
BY PRODUCTION OF COPPER AND MOLYBDENUM 1982

RANK	COPPER 1/ Mine/Company Copper Produced, lb.	% of Ariz. Production	MOLYBDENUM Mine/Company Moly. Produced, lb.	% of Ariz. Production
1	Twin Buttes/Anamax 236,143,000	13.82%	Sierrita/Duval 9,674,562	42.34%
2	Morenci Mine/Phelps Dodge 227,207,505	13.30%	San Manuel/Magma 3,792,842	16.60%
3	San Manuel Mine/Magma 213,482,000	12.49%	Twin Buttes 3,421,000	14.97%
4	Bagdad/Cyprus 173,246,000	10.14%	Bagdad/Cyprus 3,281,000	14.36%
5	Inspiration/Inspiration 122,320,949	7.16%	Pinto Valley/Cities Service 804,886	3.52%
6	Sierrita/Duval 104,537,351	6.12%		
7	Pinto Valley/Cities Service 101,348,899	5.93%		
8	Ray/Kennecott 99,238,801	5.81%		
9	Mission/ASARCO 67,644,812	3.96%		
TOTAL	1,345,169,317	78.73%	20,974,290	91.80%

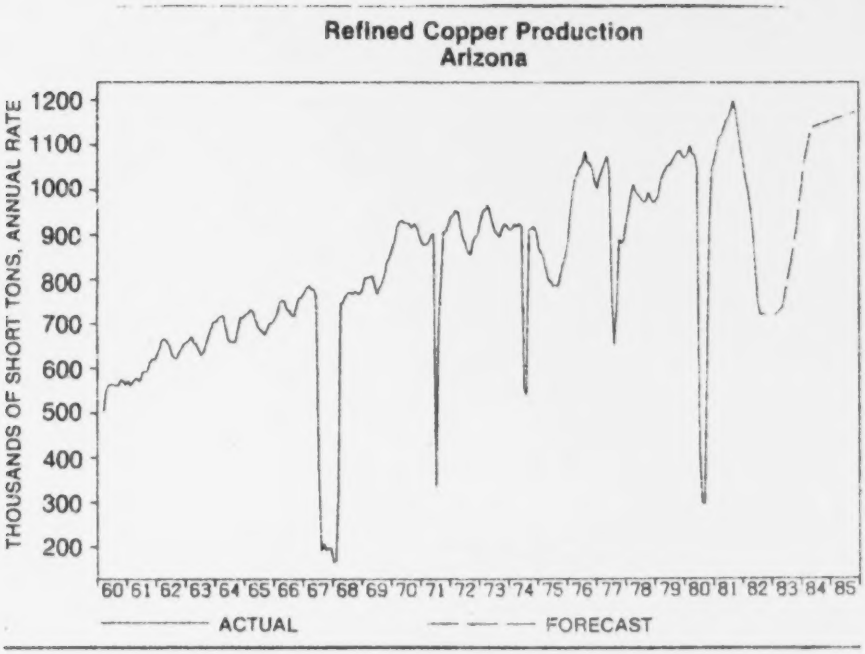
Source: Arizona Department of Mineral Resources; This Report, Table I
1/ Precipitate and/or cathode copper included in production total where applicable.

TABLE V
ARIZONA MINE PRODUCTION
OF RECOVERABLE COPPER IN SHORT TONS

	1979		1980		1981		1982		1983	
	Amount	% Change	Amount	% Change	Amount	% Change	Amount	% Change	Amount	% Change
BY MONTH										
January	78.030	0.3%	93,374	19.7%	92,769	(0.6)%	84,659	(8.7)%	68,560	(19.0)%
February	77,684	1.3	86,313	11.1	88,061	2.0	82,181	(6.7)	57,465	(30.1)
March	87,879	2.3	96,558	9.9	94,366	(2.3)	90,488	(4.1)	68,740	(24.0)
April	89,757	6.4	93,363	4.0	95,002	1.8	87,385	(8.0)	65,930	(24.6)
May	92,137	2.8	95,749	3.9	97,306	1.6	73,434	(24.5)	67,865	(7.6)
June	84,463	(0.6)	85,210	0.9	93,704	10.0	67,208	(28.3)	64,868	(3.5)
July	82,469	19.7	36,218	(56.1)	95,125	162.6	60,795	(36.1)	58,789	(3.3)
August	92,034	10.2	25,211	(72.6)	101,909	304.2	56,753	(44.3)		
September	86,867	6.7	25,237	(70.9)	98,489	290.3	55,942	(43.2)		
October	96,233	12.2	49,574	(48.5)	103,774	109.3	61,588	(40.7)		
November	89,165	3.9	75,745	(15.1)	102,832	35.8	68,010	(33.9)		
December	86,069	10.7	86,357	(0.3)	83,962	(2.8)	60,307	(28.2)		
CUMULATIVE YEAR TO DATE										
January	78,030	0.3%	93,374	19.7%	92,769	(0.6)%	84,659	(8.7)%	68,560	(19.0)%
February	155,714	0.8	179,687	15.4	180,830	0.6	166,840	(7.7)	126,025	(24.5)
March	243,593	1.4	276,245	13.4	275,196	(0.4)	257,328	(6.5)	194,765	(24.3)
April	333,350	2.7	369,608	10.9	370,198	0.2	344,713	(6.9)	260,695	(24.4)
May	425,487	2.7	465,357	9.4	467,504	0.5	418,147	(10.6)	328,560	(21.4)
June	509,950	2.1	550,567	8.0	561,208	1.9	485,355	(13.5)	393,428	(18.9)
July	592,419	4.3	586,785	(1.0)	656,333	11.9	546,150	(16.8)	452,217	(17.2)
August	684,453	5.0	611,996	(10.6)	758,242	23.9	602,903	(20.5)		
September	771,320	5.2	637,233	(17.4)	856,731	34.4	658,845	(23.1)		
October	867,553	5.9	686,807	(20.8)	960,505	39.9	720,433	(25.0)		
November	956,718	5.7	762,552	(20.3)	1,063,337	39.4	788,443	(25.9)		
December	1,042,787	6.1	848,909	(18.6)	1,147,299	35.1	848,750	(26.0)		
Average Month	86,899	6.1%	70,742	(18.6)%	95,608	35.2%	70,729	(26.0)%		

NOTE: Percentage change column shows change from corresponding period in prior year.
Source: U.S. Department of the Interior, Bureau of Mines
Prepared by: JLBC Staff
Date: September 15, 1983

TABLE VI



Indicators of Mining Growth in Arizona
1970 - 1982

Year	Taxable Sales ($000)	Employment	Payrolls ($000)	Per Capita Wages ($)	Percent Change
1970	963,893	20,600	228,804	11,107	-
1971	825,616	20,600	242,645	11,779	+ 6.1
1972	948,696	22,300	286,647	12,854	+ 9.1
1973	1,181,578	24,600	335,705	13,647	+ 6.2
1974	1,306,468	26,900	399,786	14,862	+ 8.9
1975	1,025,888	24,600	400,866	16,295	+ 9.6
1976	1,431,506	24,000	440,835	18,368	+ 12.7
1977	1,240,571	21,500	433,817	20,178	+ 9.9
1978	1,448,991	19,400	416,980	21,494	+ 6.5
1979	2,279,262	21,800	521,010	23,900	+ 11.2
1980	1,829,324	21,000	557,632	26,554	+ 11.1
1981	1,905,287	25,000	743,617	29,745	+ 12.0
1982	1,202,959	18,300	585,500	31,995	+ 7.6

Sources: Arizona Department of Revenue; Arizona Department of Economic Security; Bureau of Economic Analysis, U.S. Department of Commerce; Division of Economic and Business Research, the University of Arizona.

TABLE VII
AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES
(Percent Total Copper)

MINE OPERATION		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
ANAMAX MINING COMPANY 3/												
Twin Buttes	Sulfide	0.98	0.82	0.63	0.60	1.12	1.11	1.26	.94	.82	.74	.78
	Oxide	--	--	--	1.27	1.31	1.30	1.26	1.27	1.26	1.20	1.06
ASARCO INCORPORATED												
Mission	Sulfide	.61	.60	.61	.60	.62	.58	.59	.60	.75	.75	(.75)
Sacaton	Sulfide	--	--	.63	.74	.71	.70	.67	.68	--	--	--
San Xavier	Sulfide	--	--	--	--	--	--	--	.80	.65	.65	(.65)
	Oxide 4/	--	.61	.77	1.05	1.12	--	--	--	--	--	--
Silver Bell	Sulfide	.60	.64	.65	.72	.72	.65	.65	--	--	--	--
CITIES SERVICE COMPANY												
Pinto Valley	Sulfide	--	--	--	(.45)	(.45)	.49	.52	.49	.49	.46	.46
CYPRUS MINES CORPORATION												
Bagdad	Sulfide	.70	.70	.74	.70	.60	.59	.52	.50	.50	.50	.50
Bruce	Sulfide	3.92	3.68	3.86	3.73	3.54	3.97	closed	--	--	--	--
Johnson	Oxide 1/	--	--	--	.42	.42	.46	.44	.40	.40	.40	.40
Pima	Sulfide	.53	.51	.50	.48	.47	.48	--	.46	.49	.49	.48
DUVAL CORPORATION												
Esperanza	Sulfide	--	.34	.31	--	.29	.29	--	--	.32	.29	.29
Mineral Park	Sulfide	.41	.38	.36	.30	.28	.28	.26	.24	.24	.32	--
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Sierrita	Sulfide	.29	.28	.29	.33	.35	.34	.33	.34	.34	.30	.30
INSPIRATION CONSOLIDATED COPPER CO.												
Christmas (OP)	Sulfide	.80	.74	.57	.57	.58	.74	.--	.74	.73	.62	.62
Inspiration Area	Sulfide	.71	.67	.63	.65	.63	.70	.61	.854	.58	.58	.58
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Ox Hide	Oxide 1/	.30	--	--	.29	.27	.27	--	--	--	--	--

-continued-

TABLE VII

AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES

(Percent Total Copper)

MINE OPERATION		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
KENNECOTT CORPORATION	Sulfide	.89	.91	.83	.90	.86	.921	.856	.876	.910	.959	.80
Ray 5/	Oxide (Silicate)	1.25	1.35	1.19	1.231	1.15	--	--	--	--	--	--
MAGMA COPPER COMPANY												
San Manuel	Sulfide 2/	(.7)	--	.70	.64	(.7)	(.7)	.64	.63	.65	.635	.66
Superior	Sulfide	(4.5)	--	--	(4.5)	(4.5)	(4.5)	4.36	4.41	4.32	4.48	4.32
MCALESTER FUEL COMPANY												
Zonia	Oxide	(.53)	--	--	(.53)	--	--	--	--	--	--	--
NORANDA LAKESHORE MINES INC.												
Lakeshore 6/	Sulfide	--	--	--	--	.75	.91	--	--	--	--	--
	Oxide 1/	--	--	--	--	1.03	.93	--	--	--	1.00	1.00
PHELPS DODGE CORPORATION												
Copper Queen	Sulfide	4.41	4.06	3.48	5.70	--	--	--	--	--	--	--
Lavender	Sulfide	.64	.60	.47	--	--	--	--	--	--	--	--
Metcalf	Sulfide	--	--	--	.84	.86	.70	.79	.78	.69	--	.78
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Morenci	Sulfide	.83	.82	.82	.79	.80	.81	.80	.72	.82	.74	.72
	Oxide	--	--	--	--	--	--	--	--	--	--	--
New Cornelia	Sulfide	.70	.61	.57	.57	.66	.64	.59	.53	.51	.50	.64
RANCHERS EXPLORATION & DEVELOPMENT CORPORATION												
Bluebird	Oxide	.44	--	--	.48	.58	.79	.70	.40	.40	.40	--
WEIGHTED AVERAGE SULFIDE GRADE 7/		.64	.60	.57	.56	.61	.57	.61	.64	.58	.58	.59

Source: Company annual reports, Form 10-K's and Prospectus; "International Directory of Mining and Mineral Processing Operations", E & MJ; Arizona Department of Mineral Resources.

( ) Percentage in parenthesis is approximate: not used in calculation of weight average

TABLE VII

1/ Acid soluble copper

2/ Sulfide copper .

3/ Included ANAMAX share of Palo Verde deposit for 1979-1982.

4/ Copper bearing silica flux mined 1971-1972.

5/ Grade reported for Kennecott's Ray mine is an average of oxide and sulfide together for 1977 to 1982.

6/ The Lakeshore mine was owned and operated by the Hecla Mining Company in 1976 and 1977.

7/ Weighted average grade of ore milled, based generally on an assay of total copper.

TABLE VIII

PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES 1/

(Percent of Total Copper)

MINE OPERATION		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
ANAMAX MINING COMPANY												
Twin Buttes 5/	Sulfide	76	72	71	63	68	87	76	85	87	85	--
	Oxide	--	--	--	65	75	76	79	78	76	77	--
											Total	87
ASARCO INCORPORATED												
Mission	Sulfide	89	88	88	88	89	87	87	75	87	94	85
Sacaton	Sulfide	--	--	78	82	82	82	83	78	--	--	--
San Xavier	Sulfide	--	--	--	--	--	--	--	82	66	76	78
	Oxide	--	49	63	67	77	--	--	--	--	--	--
Silver Bell	Sulfide	85	80	78	77	81	78	78	--	--	--	--
CITIES SERVICE COMPANY												
Pinto Valley	Sulfide	--	--	--	--	--	92	89	84	83	94	95
CYPRUS MINES CORPORATION												
Bagdad	Sulfide	88	82	77	81	86	73	83	80	76	94	83
Bruce	Sulfide	90	90	90	93	92	88	closed	--	--	--	--
Johnson	Oxide 2/	--	--	--	43	91	90	96	79	86	86	--
Pima	Sulfide	84	85	85	82	84	79	--	76	84	76	89
DUVAL CORPORATION												
Esperanza	Sulfide	--	87	89	90	91	85	--	--	90	87	--
Mineral Park	Sulfide	77	81	72	81	73	75	76	73	84	75	--
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Sierrita	Sulfide	84	90	89	90	88	88	91	87	86	80	98(?)
INSPIRATION CONSOLIDATED COPPER CO.												
Christmas (OP)	Sulfide	76	66	70	73	77	74	--	--	70	71	--
Inspiration Area 3/	Sulfide	47	45	48	46	45	54	55	53	81	74	68
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Ox Hide	Oxide 2/	67	--	--	76	67	56	--	--	--	--	--

TABLE VIII

PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES

(Percent of Total Copper)

MINE OPERATION		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
KENNECOTT CORPORATION												
Ray	Sulfide	--	--	--	--	--	--	--	--	--	7	70
MAGMA COPPER COMPANY												
San Manuel	Sulfide 4/	--	--	90	87	--	--	85	83	95	87	89
Superior	Sulfide	--	--	--	--	--	--	90	91	95	93	(93 est.)
McALESTER FUEL COMPANY												
Zonia	Oxide			In-situ Leach 1973-75								
NORANDA LAKESHORE MINES INC.												
Lakeshore	Sulfide	--	--	--	--	100	99	--	--	--	--	--
	Oxide 2/	--	--	--	--	98	100	--	--	--	92	--
PHELPS DODGE CORP.												
Copper Queen	Sulfide	95	90	90	92	--	--	--	--	--	--	--
Lavender	Sulfide	69	67	52	--	--	--	--	--	--	--	--
Metcalf	Sulfide	--	--	--	63	54	56	61	59	58	--	--
	Oxide	--	--	--	--	--	--	--	--	--	--	--
Morenci	Sulfide	75	71	74	70	70	72	77	68	64	69	68
	Oxide	--	--	--	--	--	--	--	--	--	--	--
New Cornelia	Sulfide	84	85	85	80	80	82	84	80	79	78	85
RANCHERS EXPLORATION & DEVELOPMENT CORPORATION												
Bluebird	Oxide	35	--	--	34	36	38	85	36	41	156 6/	--

Source: Company Annual Reports and Form 10-K's, E & MJ International Directory; Arizona Dept. of Mineral Resources

1/ Recoveries are based on available reported production and average grade of material treated. A number of oxide operations are not listed because of inadequate data.

2/ Percent recovery of acid soluble copper.

3/ Percent recovery in flotation-concentration treatment, after ore has been leached for 1971-1979.

4/ Percent recovery of sulfide copper.

5/ Recovery includes ANAMAX's share of Palo Verde 1979-1981-1982.

6/ Recovery by leaching heaps continued after mining was terminated in July 1981.

TABLE IX

STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES 1/

(Waste:Ore)

MINE OPERATION	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
ANAMAX MINING COMPANY				5/							
Twin Buttes	5.30:1	7.60:1	10.80:1	71.60:1	5.50:1	5.60:1	2.00:1	2.90:1	3.32:1	3.62:1	2.05:1
ASARCO INCORPORATED											
Eisenhower 5/	--	--	--	--	--	--	--	--	--	.71:1	.67:1
Mission	3.10:1	2.50:1	2.30:1	1.50:1	1.50:1	2.30:1	2.30:1	0.76:1	3.05:1	2.01:1	1.62:1
Sacaton	--	--	--	6.30:1	5.90:1	4.40:1	2.70:1	3.10:1	2.02:1	1.30:1	.70:1
San Xavier	--	--	--	--	5.10:1	5.00:1	1.10:1	1.10:1	6.01:1	6.18:1	2.90:1
Silver Bell	2.50:1	3.50:1	3.40:1	2.00:1	1.60:1	1.80:1	1.40:1	1.50:1	--	1.41:1	--
CITIES SERVICE COMPANY											
Pinto Valley	--	--	--	1.80:1	1.70:1	1.70:1	1.60:1	1.80:1	1.07:1	1.77:1	1.80:1
CYPRUS MINES CORPORATION											
Bagdad	5.20:1	5.20:1	4.50:1	1.20:1	9.80:1	7.80:1	1.70:1	1.80:1	1.52:1	1.78:1	1.45:1
Johnson	--	--	--	0.56:1	1.50:1	1.60:1	2.50:1	1.30:1	2.01:1	1.52:1	-- 8/
Pima	--	1.60:1	2.80:1	2.00:1	2.00:1	1.60:1	--	5.20:1	6.28:1	3.06:1	1.42:1
DUVAL CORPORATION											
Esperanza	--	1.50:1	1.50:1	0.71:1	1.10:1	1.10:1	--	1.30:1	0.76:1	1.95:1	--
Mineral Park	0.83:1	0.66:1	0.90:1	0.66:1	2.10:1	1.60:1	1.50:1	1.70:1	1.71:1	1.44:1	--
Sierrita	1.70:1	1.50:1	1.70:1	1.40:1	1.50:1	1.60:1	1.30:1	1.10:1	1.11:1	.98:1	.55:1
INSPIRATION CONSOLIDATED COPPER COMPANY											
Christmas	4.90:1	5.80:1	5.10:1	3.40:1	3.10:1	4.40:1	--	--	4.40:1	3.24:1	--
Inspiration Area	1.80:1	1.90:1	2.20:1	3.10:1	1.90:1	2.40:1	2.80:1	3.40:1	2.40:1	1.53:1	1.42:1
Ox Hide	0.43:1	.028:1	0.32:1	0.38:1	0.38:1	0.20:1	--	--	--	--	--
KENNECOTT CORPORATION											
Ray	2.70:1	2.60:1	3.00:1	3.50:1	2.60:1	2.50:1	3.10:1	2.70:1	3.15:1	1.88:1	2.30:1

TABLE IX

STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES 1/

(WASTE:ORE)

MINE OPERATION	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
PHELPS DODGE CORPORATION											
Lavender	1.20:1	1.10:1	0.83:1	--	--	--	--	--	--	--	--
Metcalf	--	--	--	2.80:1	1.80:1	1.80:1	1.50:1	2.30:1	1.67:1	--	--
Morenci	2.20:1	1.90:1	2.00:1	1.80:1	1.30:1	1.50:1	1.50:1	1.40:1	1.30:1	1.63:1	.79:1
New Cornelia	1.90:1	1.90:1	1.50:1	1.50:1	1.10:1	1.10:1	1.40:1	1.00:1	2.27:1 2/	.48:1 2/	1.21:1
RANCHERS EXPLORATION & DEVELOPMENT CORPORATION											
Bluebird	--	1.00:1 7/	1.30:1	1.30:1	1.80:1	3.30:1	1.50:1	1.50:1	1.50:1	.003:1 6/	--
WEIGHTED AVERAGE*	2.36:1	2.51:1	2.70:1	3.03:1 4/	1.79:1	2.21:1	1.75:1	1.75:1	1.90:1	1.57:1	1.31:1

Source: "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines; Company Annual Reports: EMJ International Directory of Mining and Mineral Processing Operations; Arizona Department of Mineral Resources; Company submitted data for 1982.

1/ Leachable rock included with waste (except at solely leach operations).
2/ Includes preproduction stripping.
3/ Stripping continued as sulfide concentrator was shut down from March 1975 to January 1976.
4/ Without Twin Buttes the ratio would be 1.89:1
5/ Mining is done by ASARCO, includes ANAMAX's share of ore.
6/ Stripping of overburden ceased in January but mining continued until July.
7/ Not used in calculation of weighted average.
8/ No stripping in 1982.

*NOTE: These are now weighted averages so use caution in making comparisons to the averages presented in previous editions of this report.

TABLE X

ARIZONA PRODUCTION AND VALUE OF COPPER, MOLYBDENUM, GOLD AND SILVER

RECOVERED FROM COPPER ORE

Year	Copper Ore 1/ Tons	Gold 2/ Troy Ounces Value 5/	Silver 2/ Troy Ounces Value 5/	Molybdenum 3/ 1,000 lbs. Value (in $1,000)	Copper 4/ Pounds Value	Copper 4/ Lbs. Cu/ton ore Ave.¢/lb. 7/	Value of Copper Gold, Silver & Molybdenum
1970	150,240,842	107,292 $3,904,400	7,130,261 $12,626,700	15,672 $26,700	1,694,294,000 $ 977,608,000	11.28 57.700	$1,020,839,100
1971	149,293,547	93,617 3,820,510	6,106,204 $ 9,437,749	22,684 $39,872	1,529,780,500 $ 786,812,004	9.76 51,433	$ 839,942,263
1972	165,914,825	102,526 $5,987,518	6,614,957 $11,143,226	27,216 $46,791	1,695,858,000 858,392,446	10.22 50.617	$ 922,314,190
1973	181,311,945	102,376 $10,013,397	7,164,988 $18,325,173	37,657 $59,372	1,735,012,000 $1,021,314,814	9.57 58.865	1,109,025,384
1974	178,913,296	90,206 $14,488,424	6,308,721 $29,701,332	28,346 $57,067	1,609,808,000 $1,233,901,735	9.00 76.649	$1,335,158,491
1975	168,750,152	82,759 $13,364,751	6,190,805 $27,354,196	25,030 $61,411	1,502,978,000 $ 954,917,072	8.91 63.535	$1,057,047,019
1976	194,136,559	97,961 $12,276,473	7,308,395 $31,816,805	31,073 $89,148	1,912,430,000 $1,316,210,823	9.85 68.824	$1,449,452,101
1977	168,641,401	87,874 $13,032,593	6,696,415 $30,957,660	34,574 $120,497	1,705,240,000 $1,122,184,339	10.11 65.808	$1,166,295,089
1978	178,204,491	92,508 $17,905,108	6,611,781 $35,709,502	33,029 $150,142	1,817,670,000 $1,190,755,617	10.20 65.510	$1,244,520,369
1979	203,977,408	99,549 $30,622,766	7,454,306 $82,699,941	35,101 $213,065	1,914,501,095 $1,767,735,441	9.39 92.334	$2,094,081,895

-continued-

TABLE X

ARIZONA PRODUCTION AND VALUE OF COPPER, MOLYBDENUM, GOLD AND SILVER

RECOVERED FROM COPPER ORE

Year	Copper Ore 1/ Tons	Gold 2/ Troy Ounces Value 5/	Silver 2/ Troy Ounces Value 5/	Molybdenum 3/ 1,000 lbs. Value (in $1,000)	Copper 4/ Pounds Value	Copper 4/ LBS. Cu/ton ore Ave. ¢/lb. 7/	Value of Copper Gold, Silver & Molybdenum
1980	169,650,401	71,533 $43,814,606	5,640,703 $116,376,559	36,299 $324,150	1,521,850,812 $1,543,400,219	8.97 101.416	$2,027,741.384
1981	216,787,430	95,496 $43,891,299	7,565,368 $ 79,575,340	35,600 $273,052	2,143,898,000 $1,795,385,941	9.89 83,744	$2,191,904,580
1982	146,124,870	61,050 $22,949,000	6,301,000 $50,090,000	22,099 $100,673	1,697,500,000 $1,261,415,000	11.62 74.31	$1,435,127,000

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Source: "Mineral Yearbook - Area Reports: Domestic", U.S. Bureau of Mines

1/ Includes some copper-zinc, copper-lead, and /or lead-zinc ore in 1972 and thereafter

2/ Excludes gold and silver recovered from vat or heap leaching of copper ores and from copper tailings or copper cleanup in 1969 and thereafter.

3/ Molybdenum content of recovered concentrate.

4/ Excludes precipitate copper from dump and in-place leaching prior to 1982.

5/ At average annual domestic, free market gold price in 1970 and thereafter: 1970, $36.39, 1971, $40.81; 1972, $58.40; 1973, $97.81; 1974, $159.73; 1975, $161.49; 1976, $125.32; 1977, $148.31; 1978, $193.55; 1979, $307.615; 1980, $612.509; 1981, $459.614; 1982, $375.905.

6/ At E&MJ average annual N.Y. market price for .999 fine silver

7/ At E&MJ average annual price, domestic FOB refinery.

TABLE XI

ARIZONA MINE PRODUCTION (RECOVERABLE) OF GOLD, SILVER, COPPER, LEAD AND ZINC IN 1982

BY CLASS OF ORE OR OTHER SOURCE MATERIAL

SOURCE	No. of mines 1/	Material sold or treated (Short tons)	Gold (Troy ounces)	Silver (Troy ounces)	Copper (Short tons)	Lead (Short tons)	Zinc (Short tons)
Lode ore:							
Gold 2/	2	W	W	W	W	W	-
Gold-Silver	2	W	W	W	W	-	-
Silver	7	95,140	W	105,563	W	W	-
Total	11	144,244	3,352	159,104 3/	137	W	-
Copper	21	135,768,647	W	6,058,403	778,648 4/	206 3/	-
Lead	1	W	-	W	-	W	-
Total	22	W	W	W	778,648 5/	W	-
Other Lode Material:							
Gold tailings	-	12,000	516	742	-	-	-
Gold-silver tailings 6/	-	W	W	W	W	W	-
Copper precipitates	5	95,262	-	-	66,788	-	-
Total 7/	5	W	W	W	W	396	-
GRAND TOTAL 7/	33	136,203,497	61,050	6,300,671	848,750	-	-

-continued-

TABLE XI
-Continued-

Source: "Minerals Yearbook - Area Reports; Domestic 1982", U.S. Bureau of Mincs (Preliminary Data)
W Withheld to avoid disclosing company proprietary data.
1/ Data will not add to total shown because some mines produce more than one class of material. Operations from which metals are recovered only from tailings or precipitates are not counted as producing mines.
2/ Includes material that was leached.
3/ Includes columnar data indicated by symbol "W" to avoid disclosing company proprietary data.
4/ Includes copper recovered from precipitates of ore leached.
5/ Does not include copper from lead ore.
6/ Combined to avoid disclosing company proprietary data.
7/ Data may not add to totals shown because of independent rounding.

TABLE XII

NONFUEL MINERAL PRODUCTION IN ARIZONA 1/

MINERAL	1981 Quantity	1981 Value (thousand)	1982 Quantity	1982 Value (thousand)
Clays----------thousand short tons-------	148	1,105	143	998
Copper (recoverable content of ores, etc.) short tons --	1,147,299	1,953,142	848,750	1,261,415
Gem stones----------	NA	3,250	NA	2,800
Gold (recoverable content of ores, etc.) troy ounces----	100,339	46,120	61,050	22,949
Gypsum----------thousand short tons-------	213	2,594	175	1,205
Lead (recoverable content of ores, etc.) short tons-----	1,095	800	396	202
Lime----------thousand short tons-------	538	29,913	326	77,080
Molybdenum (content of concentrate) thousand pounds-----	35,808	254,345	22,099	100,673
Pumice----------thousand short tons-------	1	3	1	7
Sand and gravel----------do----------	21,169	65,795	19,231	59,992
Silver (recoverable content of ores, etc.) thousand troy ounces------	8,055	84,728	6,301	50,090
Stone:				
Crushed----------thousand short tons-------	6,315	26,263	5,200	22,200
Dimension----------do----------	W	578	W	580
Combined value of asbestos, cement (masonry & portland), perlite,pyrites, salt, tungsten, vanadium (1982), zinc, and values indicated by symbol W.	XX	93,009	XX	79,105
Total	XX	2,561,645	XX	1,619,296

Source: "The Mineral Industry of Arizona", Minerals Yearbook U.S. Bureau of Mines, 1982

NA Not Available.

W Withheld to avoid disclosing company proprietary data; value included in "Combined Value" figure.

XX Not Applicable.

1/

TABLE XIII

COPPER MINE CAPACITY IN ARIZONA 1/
(Short tons of Recoverable Copper/Year)

OPERATOR	MINE	CAPACITY
Phelps Dodge	Morenci	155,000
Anamax	Twin Buttes	135,000 2/
Magma	San Manuel	130,000
Kennecott	Ray	114,000
Duval	Sierrita	102,000
Cities Service	Pinto Valley	85,000
Cyprus	Bagdad	76,000
Phelps Dodge	Metcalf	65,000
Inspiration	Inspiration Area	55,000
Phelps Dodge	New Cornelia	45,000
Cyprus	Pima	45,000
Magma	Superior (Magma)	42,500
ASARCO 3/	Mission	35,000
ASARCO	Silver Bell	23,500
Duval	Esperanza	22,500
ASARCO	Sacaton	22,000
Noranda	Lakeshore	21,000
Duval	Mineral Park	17,000
ASARCO 3/	Eisenhower	13,000
ASARCO 3/	San Xavier	9,000
Inspiration	Christmas	8,500
Ranchers	Bluebird	8,000
Cities Service	Miami	6,000
Cyprus	Johnson	5,500
Phelps Dodge	Copper Queen/Lavender	3,500
Inspiration	Ox Hide	2,500
Cities Service	Copper Cities	2,000
	TOTAL	1,248,500

Source: Arizona Department of Mineral Resources file data; Company Annual Reports and Form 10-K; Professional Publications.

1/ Figures generally represent a current estimate of the productive capacity of primary recoverable copper in concentrates, precipitates, and cathodes. Figures do not represent smelter or refinery capacity. The estimates are based on recent production figures and on capacities of concentrator and leach plant facilities. Other factors affecting actual production include, for example, grade of ore and recovery. Some capacities have been published by the reporting company.

2/ Includes approximately 33,000 tons of copper concentrated annually from ore obtained at the Eisenhower mine.

3/ The Mission mill treats ore from the Mission, San Xavier and ASARCO's share of Eisenhower mine production.

TABLE XIV
MINE PRODUCTION OF RECOVERABLE COPPER IN THE UNITED STATES

(Short Tons)

STATE	1981	Rank In 1981	1982	Rank In 1982
ARIZONA	1,147,299	1	842,050	1
IDAHO	4,679	6	3,491	6
MISSOURI	9,272	5	8,976	5
MONTANA	68,878	4	70,667	4
NEW MEXICO	169,881	3	81,421	3
UTAH	232,892	2	206,925	2
OTHER STATES 1/	62,628		39,405	
TOTAL	1,695,529		1,253,535	

Source: American Bureau of Metal Statistics, Inc. Non-Ferrous Metal Data 1982, p. 25. Derived from U. S. Bureau of Mines data.

1/ Includes California, Colorado, Maine, Michigan, Nevada, Oregon, Tennessee and Washington.

TABLE XV

"COVERED EMPLOYMENT" AND WAGES IN ARIZONA COPPER MINING AND SMELTING

Year	Average No. Covered Employees 1/	Total Wages	Average Annual Wage	Average Weekly Wage	Tons Copper Ore 2/
1948	11,493	$ 41,318,524	$ 3,595	$ 69.13	39,072,204
1949	11,001	40,612,224	3,692	71.00	37,365,611
1950	10,181	41,994,321	4,125	79.33	41,757,273
1951	10,754	47,825,698	4,447	85.52	42,784,388
1952	11,365	54,950,235	4,835	93.14	44,472,522
1953	12,068	62,742,982	5,199	99.98	45,187,838
1954	12,502	65,518,853	5,241	100.79	43,072,894
1955	12,399	71,293,263	5,750	110.58	52,189,728
1956	14,008	83,568,996	5,966	114.73	60,468,580
1957	14,652	85,125,320	5,809	111.71	59,571,834
1958	14,100	74,726,972	5,300	101.93	56,255,809
1959	11,568	72,095,130	6,232	119.85	53,121,545
1960	13,764	90,312,848	6,562	126.19	66,032,439
1961	14,275	97,271,286	6,814	131.04	71,918,991
1962	14,408	101,920,108	7,074	136.04	78,868,147
1963	14,303	104,291,588	7,292	140.23	80,615,132
1964	14,720	113,792,031	7,730	148.65	86,132,039
1965	15,239	122,163,124	8,016	154.16	92,859,535
1966 1/	17,018	137,187,611	8,061	155.02	101,558,298
1967	13,426	108,427,206	8,076	155.31	74,289,203
1968	15,734	136,089,579	8,649	166.33	101,293,963
1969	19,459	173,183,018	8,900	171.15	127,848,828

TABLE XV CONTINUED

"COVERED EMPLOYMENT" AND WAGES IN ARIZONA COPPER MINING AND SMELTING

Year	Average No. Covered Employees 1/	Total Wages	Average Annual Wage	Average Weekly Wage	Tons Copper Ore 2/
1970	21,479	$201,665,064	$ 9,389	$180.56	150,241,000
1971	21,231	211,978,597	9,984	192.00	149,094,000
1972	23,233	254,717,341	10,964	210.85	169,218,825 2/
1973	25,494	291,294,328	11,426	218.89	181,311,945
1974	27,894	340,832,096	12,219	234.98	178,913,296
1975	25,950	363,349,178	14,002	269.27	168,750,152
1976	25,631	405,289,034	15,812	304.08	194,136,559
1977	23,373	398,539,789	16,835	323.75	168,641,401
1978	21,092	397,790,419	18,860	362.69	178,204,491
1979	23,239	494,963,476	21,299	409.60	203,997,408
1980	21,602	510,168,454	23,617	454.17	169,650,401
1981	26,031	687,434,798	26,408	507.85	216,787,430
1982	17,182	487,415,292	28,368	545.53	135,768,647

Source: This report, Table XV "Minerals Yearbook - Area Reports; Domestic", U.S.Bureau of Mines.

1/ "Covered Employment" by law includes all employees of employers of three or more persons. Since the "Average Number of Covered Employees" in this table generally includes practically all workers in copper mining and processing (see Table XIII), the number of employees is greater than the number tabulated under "All Employees" in Table XIV. Prior to 1966 only a portion of the workers in smelting refining, and rod fabrication were included in this table; the rest of the end-processing workers were separated and classified under "Manufacturing" in Table XIII.

2/ Mine production in short tons of lode ore from "Arizona, Mine Production by Class of Ore", reported by the U.S. Bureau of Mines. In 1972 and thereafter the tonnage may include copper-zinc, copper-lead and lead-zinc ore combined to avoid disclosing individual company confidential data. Data is preliminary for 1981.

TABLE XVI

ARIZONA INDUSTRIES COVERED BY SOCIAL SECURITY

YEAR - 1982

Industry	Average Number of Employees 1/	Total Wages	Average Annual Wage	Average Weekly Wage
Copper Mining	14,463	411,407,669	28,446	547.03
Copper Smelting, Refining & Rod Fabrication	2,719	76,007,623	27,954	537.58
TOTAL COPPER MINING & PROCESSING	17,182	487,415,292	28,368	545.53
Other Mining, Quarrying & Processing	3,027	81,758,339	27,010	519.42
ALL MINING, QUARRYING & PROCESSING	20,209	569,173,631	28,164	541.62
Mfg. Except Copper Processing	151,086	3,091,130,022	20,459	393.45
Construction	64,935	1,276,498,123	19,658	378.04
Transp., Utilities, etc. 2/	49,027	1,050,[illegible]786	21,[illegible]45	416.25
Wholesale-Retail Trade	253,151	2,949,228,683	11,650	224.04
Services, Finance & Misc.	272,637	3,896,812,826	14,256	274.16
Agriculture & Related Services	25,[illegible]65	269,772,[illegible]42	10,377	197.64
Federal, State & Local Government	188,769	3,314,677,664	17,559	337.68
TOTAL AND AVERAGES	1,024,950	16,401,649,007	16,002	307.73

Source: Research and Statistics Unit, Arizona Department of Economic Security

1/ Includes all covered employees

2/ Transportation exclusive of railroads

TABLE XVII

EMPLOYMENT, EARNINGS AND HOURS IN COPPER MINING

IN THE UNITED STATES AND ARIZONA 1/

	All Employees		PRODUCTION WORKERS											
	Average No. (Thousands)		Average No. (Thousands)		Average Weekly Earnings		Average Weekly Hours		Average Hourly Earnings		Average Earnings Per Man Per Year		Aggregate Man-Hours (Thousands)	
Period	2/ Ariz.	3/ U.S.	4/ Ariz.	5/ U.S.	Ariz.	U.S.	Ariz.	U.S.	6/ Ariz.	U.S.	7/ Ariz.	U.S.	8/ Ariz.	U.S.
1970	18.8	37.0	14.9	29.5	173.01	175.67	43.8	44.7	3.95	3.93	8,997	9,135	32,936	68,570
1971	18.9	34.7	14.9	26.8	178.50	178.46	42.4	42.9	4.21	4.16	9,282	9,280	32,852	59,785
1972	20.5	38.9	15.1	30.7	194.69	192.19	41.6	41.6	4.68	4.62	10,124	9,994	34,827	66,410
1973	21.5	42.3	17.6	33.7	205.75	206.42	41.6	42.3	4.97	4.88	10,751	10,734	38,072	74,127
1974	24.0	42.3	19.1	33.8	222.16	226.46	39.6	41.1	5.61	5.51	11,552	11,776	39,331	72,237
1975	22.5	37.1	17.9	28.4	247.43	247.14	38.6	39.2	6.41	6.33	12,866	12,903	35,929	57,891
1976	21.7	35.5	17.2	27.0	285.31	280.70	40.1	40.1	7.14	7.00	14,888	14,596	35,865	56,300
1977	19.3	35.1	15.3	26.9	302.99	288.78	39.4	38.6	7.69	7.48	15,755	15,014	31,347	53,994
1978	17.2	35.2	13.7	26.9	344.76	338.40	40.8	40.0	8.45	8.46	17,928	17,597	29,066	55,952
1979	19.3	31.9	15.3	24.6	404.81	405.03	42.3	42.5	9.57	9.53	21,050	21,061	33,654	54,366
1980	17.7	29.4	14.0	22.6	446.19	435.01	41.7	41.0	10.70	10.61	23,202	22,621	30,358	48,183
1981	21.9	36.2	17.4	27.9	497.28	492.54	41.2	41.6	12.07	11.84	25,859	25,612	37,278	60,353
1982	15.2	25.3	12.1	18.5	495.60	484.91	38.3	38.7	12.94	12.53	25,771	25,215	24,098	37,229

TABLE XVII CONTINUED

EMPLOYMENT, EARNINGS AND HOURS IN COPPER MINING

IN THE UNITED STATES AND ARIZONA

	Copper Ore Mined (Thousand Short Tons)		Copper Produced (Recoverable Content) (Thousand Pounds)		Worker Productivity: Copper Ore Mined per man-hour (Tons)		Worker Productivity: Copper Produced per man-hour (Pounds)	
Period	Ariz.	U.S.	Ariz.	U.S.	Ariz.	U.S.	Ariz.	U.S.
1970	150,241	257,729	1,826,734	3,368,957	4.427	3.759	53.829	49.132
1971	149,294	242,656	1,633,568	2,986,599	4.544	4.059	49.725	49.996
1972	165,815	266,831	1,816,118	3,264,113	4.761	4.017	52.161	49.151
1973	173,605	289,998	1,847,635	3,386,357	4.872	3.912	48.530	45.683
1974	178,821	293,443	1,710,744	3,145,148	4.547	4.062	43.496	43.539
1975	168,656	263,003	1,619,535	2,772,111	4.694	4.543	45.076	47.885
1976	194,046	283,736	2,043,168	3,166,889	5.410	5.040	56.968	56.250
1977	168,601	259,974	1,843,949	2,964,539	5.379	4.815	58.824	54.905
1978	178,201	263,722	1,965,072	2,955,210	6.131	4.713	67.607	52.817
1979	203,977	291,078	2,085,556	3,140,110	6.061	5.369	61.971	57.759
1980	169,650	241,090	1,669,495	2,527,920	5.588	5.004	54.994	52.465
1981	215,787	306,089	2,294,437	3,354,548	5.815	5.072	61.549	55.582
1982	146,125	217,922	1,697,500	2,507,070	6.064	5.854	70.442	67.342

Source: Research and Statistics Unit, Arizona Department of Economic Security; "Minerals Yearbook -- Metals, Minerals," U.S. Bureau of Mines. "Employment and Earnings", March issues, U.S. Department of Labor.

TABLE XVII CONTINUED

EMPLOYMENT, EARNINGS AND HOURS IN COPPER MINING

IN THE UNITED STATES AND ARIZONA 1/

1/ Statistics do not reflect workers in copper smelting, refining and rod fabrication.

2/ These figures are estimates made by the Arizona Department of Economic Security, in cooperation with the U.S. Bureau of Labor Statistics, and they include all full and part time wage and salary workers who were employed in copper mining in any part of the pay periods which included the 12th of each month of the year.

3/ Estimates made by the U.S. Bureau of Labor Statistics, in cooperation with the 50 states, and based upon monthly samplings similar to those in 2/ above, adjusted periodically to census bench marks.

4/ Estimates of production (non-supervisory) workers based upon samplings as in 2/ above. Since 1975, figures have been calculated by the Arizona Department of Mineral Resources dividing the annual number of "All Employees - Arizona" by a factor of 1.26. This factor was derived by comparing the annual number of "All Employees - Arizona with "Production Workers - Arizona" from 1970 to 1974.

5/ Earnings figures for a particular year is the product of "Average Hourly Earnings" and "Average Weekly Hours" for that year.

6/ Gross payroll aggregates, exclusive of irregular bonuses and other pay not earned in a sample pay period, are divided by gross man-hour aggregates of production and related workers for the period in order to determine average hourly earnings.

7/ "Average Weekly Earnings" times 52 weeks.

8/ Number of production workers times "Average Weekly Hours" times 52 weeks.

9/ Copper ore mined includes ore shipped directly to smelters, treated by concentration, and ore leached in heaps, vats or tanks.

10/ Copper produced includes recoverable copper from copper ore (see 9/) and from copper precipitates and cathodes produced from dump and in-place leaching.

TABLE XVIII

REFINED COPPER INVENTORIES AT MONTH END
AMOUNTS IN THOUSANDS OF SHORT TONS

U. S. STOCKS

1979	Jan	318.4	Mar	262.1	May	197.8	Jul	174.6	Sep	154.6	Nov	167.3
	Feb	287.5	Apr	237.4	Jun	176.0	Aug	158.0	Oct	148.6	Dec	186.3
1980	Jan	203.5	Mar	237.1	May	277.3	Jul	310.6	Sep	274.6	Nov	246.0
	Feb	228.2	Apr	269.1	Jun	295.7	Aug	301.0	Oct	265.0	Dec	253.0
1981	Jan	261.6	Mar	236.8	May	243.4	Jul	276.9	Sep	275.5	Nov	301.2
	Feb	249.4	Apr	245.5	Jun	264.7	Aug	276.0	Oct	281.6	Dec	338.6
1982	Jan	351.9	Mar	387.3	May	422.5	Jul	463.7	Sep	436.2	Nov	470.6
	Feb	375.9	Apr	409.8	Jun	448.1	Aug	449.9	Oct	438.2	Dec	484.5

STOCKS OUTSIDE U. S.

1979	Jan	878.2	Mar	765.1	May	756.7	Jul	687.1	Sep	648.2	Nov	641.3
	Feb	862.4	Apr	758.8	Jun	727.2	Aug	696.6	Oct	635.4	Dec	619.5
1980	Jan	598.3	Mar	534.6	May	525.9	Jul	530.9	Sep	527.9	Nov	472.6
	Feb	560.9	Apr	516.5	Jun	531.2	Aug	553.2	Oct	489.1	Dec	476.2
1981	Jan	485.2	Mar	463.0	May	449.8	Jul	454.9	Sep	433.4	Nov	403.0
	Feb	471.0	Apr	458.8	Jun	446.0	Aug	454.7	Oct	419.4	Dec	432.5
1982	Jan	446.3	Mar	459.5	May	459.0	Jul	492.0	Sep	521.7	Nov	642.9
	Feb	448.4	Apr	452.2	Jun	479.3	Aug	504.4	Oct	592.3	Dec	699.9

WORLD STOCKS

1979	Jan	196.6	Mar	027.2	May	954.5	Jul	861.7	Sep	802.8	Nov	808.6
	Feb	149.9	Apr	996.2	Jun	903.2	Aug	854.6	Oct	784.0	Dec	805.8
1980	Jan	801.8	Mar	771.7	May	803.2	Jul	841.5	Sep	802.5	Nov	718.6
	Feb	789.1	Apr	785.6	Jun	826.9	Aug	854.2	Oct	754.1	Dec	729.2
1981	Jan	746.8	Mar	699.8	May	693.2	Jul	731.8	Sep	708.9	Nov	704.2
	Feb	720.4	Apr	704.3	Jun	710.7	Aug	730.7	Oct	701.0	Dec	771.1
1982	Jan	798.2	Mar	846.8	May	881.5	Jul	955.7	Sep	957.9	Nov	1,113.7
	Feb	824.3	Apr	862.0	Jun	927.4	Aug	954.3	Oct	1,030.5	Dec	1,184.4

Prepared by: JLBC Staff
Date: February 1, 1983

TABLE XIX

AVERAGE QUOTED PRICE OF 1/

ELECTROLYTIC COPPER WIREBAR

DOMESTIC, DELIVERED

Price in Cents Per Pound

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
January	52.388	68.753	69.028	63.625	66.240	63.625	76.574	119.385	88.570	78.634	80.219 2/
February	54.571	68.575	64.180	63.625	68.625	63.593	89.697	133.808	86.071	78.779	
March	59.806	68.575	64.180	64.682	72.551	62.410	96.718	106.040	87.382	75.862	
April	60.083	68.575	64.180	69.241	74.393	64.625	98.322	94.851	88.033	76.273	
May	60.083	81.459	63.780	70.625	72.606	64.768	91.234	93.479	85.798	77.948	
June	60.083	86.245	63.136	70.625	71.199	66.569	88.241	92.713	85.226	71.488	
July	60.083	86.596	62.484	74.625	67.996	64.079	86.768	103.565	84.412	71.053	
August	60.083	86.596	63.790	74.625	63.792	67.232	91.335	100.708	87.387	70.999	
September	60.083	83.663	63.790	74.625	60.625	67.632	95.853	98.864	84.722	71.065	
October	60.083	78.428	63.790	72.064	60.625	70.495	99.106	99.471	82.312	72.413	
November	60.163	76.249	63.790	70.625	60.625	71.191	99.708	96.982	81.216	72.968	
December	66.367	73.572	63.790	65.774	61.942	71.897	106.448	89.127	80.293	74.230	

1/ MW US Producer Delivered.

2/ The current price (2/4/83) is 81.763 cents per pound.

Source: Metals Week

Prepared by: JLBC Staff
Date: February 9, 1983

TABLE XX

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
AMAX MINING COMPANY	Helvetia	Sulfide	320	0.64	Publ. 1973; cutoff at 0.3% Cu
	Helvetia	Oxide	20	0.55	Publ. 1973; acid soluble Cu; cutoff at 0.3% acid soluble Cu.
	Peach Elgin	Mixed	23	0.75	Publ. 1973; cutoff at 0.4% Cu.
	Twin Buttes	Sulfide	191	0.63	Publ. in Amax Inc. 1982 Annual Report.
	Twin Buttes	Oxide	16	0.93	Publ. in Amax Inc. 1982
ASARCO Inc.	Mission	Sulfide	84.782	0.75	With 0.17 Ag oz/ton. Publ. ASARCO 1982 Annual Report.
	Poston Butte	Mixed		0.47	32-42 million tons possible. Publ. E & MJ 1972.
	Sacaton (OP)	Sulfide	13.503	0.70	Publ. in ASARCO Inc. 1979 Form 10-K
	Sacaton East (UG)	Sulfide	14.898	1.25	Publ. in ASARCO Inc. 1979 Form 10-K
	San Xavier	Sulfide	161.734	0.52	With .08 oz/ton Ag. Publ. in 1982 Annual Report.
	Silver Bell	Sulfide	22.713	0.68	With .07 oz/ton Ag. Publ. in 1982 Annual Report.
	Silver Bell	Oxide			
AZTEC MINING CORP.	Mame	Oxide	2	1.00	Unpublished estimate.
BS&K MINING COMPANY	Atlas	Mixed			
CASA GRANDE COPPER COMPANY	Casa Grande	Mixed	352	1.00	Publ. in Getty Oil Co. 1980 Annual Report
CF & I STEEL CORP.	Dragoon	Oxide			

TABLE XX (Cont.)

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
CITIES SERVICE COMPANY	Cactus	Oxide			
	Copper Cities	Oxide			
	Miami	Oxide			
	Miami East	Mixed (?)	6.0	3.14	1981 Communication with company.
	Old Dominion	Sulfide			
	Pinto Valley	Sulfide	316.0	0.44	Publ. in 1983 E&MJ International Directory.
COCHISE DEV. GROUP	Bisbee-North	Mixed (?)	20	0.80	Unpublished estimate.
COCHISE MINING CORP.	San Juan	Oxide	20	0.50	Unpublished estimate.
CONTINENTAL OIL CO.	Poston Butte	Mixed	800	0.40	Publ. 1979 from Copper Studies Inc.
CYPRUS MINES CORP.	Bagdad	Sulfide	326	0.50	With 0.03 Mo.
	Bagdad	Oxide	38	0.33	Acid soluble Cu.
	Bruce	Sulfide	0.1276	3.73	Publ. 1976 in Form 10-K with 12.0% Zn.
	I-10	Mixed	100	0.52	Unpublished estimate; with 0.03% Mo.
	Johnson	Oxide	6.643	0.40	Acid souble Cu. Publ. in 1983 E&MJ International Directory.
	Pima	Sulfide	120.767	0.482	Publ. 1983 E&MJ International Directory.
DUVAL CORPORATION	Esperanza	Sulfide	48.783	0.27	With .034% Mo.
	Mineral Park	Sulfide	35.577	0.17	With .054% Mo.
	Sierrita	Sulfide	366.138	0.30	With .035% Mo. Above publ. in Pennzoil Co. 1981 Form 10-K.

TABLE XX (Cont.)

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
EISENHOWER MINING CO.	Palo Verde (Anamax)	Sulfide	97.182	0.60	With 0.12 oz/ton Ag. Calculated.
	Palo Verde (ASARCO)	Sulfide	31.485	0.79	With 0.21 oz/ton Ag. Published in ASARCO 1982 Annual Report.
EL PASO COMPANY	Emerald Isle	Oxide	1.5	0.40	3 million tons at 0.1% Cu. USBM RI 8236, Publ. 1977.
FREEPORT-McMORAN INC.	Santa Cruz	Mixed			
INSPIRATION CONSOLIDATED COPPER COMPANY	Christmas (OP)	Sulfide	7.567	0.63	Publ. in Hudson Bay 1982 Annual Report
	Christmas (OP)	Oxide			
	Christmas (UG)	Sulfide	20.131	1.78	Includes "probable" ore. Publ. in Inspiration 1980 Annual Report.
	Inspiration Area Mines	Mixed	191.529	0.54	Publ. in Hudson Bay 1982 Annual Report.
	Ox Hide	Oxide	29.309	0.31	Publ. in Inspiration 1979 Annual Report
	Sanchez	Oxide	79.362	0.35	Publ. in Inspiration 1980 Annual Report
KENNECOTT CORPORATION	Chilito	Mixed			
	Lone Star	Mixed	2000	0.41	Reported at Ariz. Conference AIME 12/77.
	Lone Star Ext.	Mixed			
	Ray	Sulfide	606.144	0.70	With .01% Mo. Publ, in "World Mining" May 1981.
	Ray	Silicate	225.760	0.68	Publ. in "World Mining" May 1981.
KERR McGEE CORPORATION	Red Mountain	Sulfide		0.71	Publ. 1970 100 million tons possible.

TABLE XX (Cont.)

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
KEYSTONE MINERALS INC.	Korn Kob	Oxide	8	0.50	Publ. in "Pay Dirt" July 1973
MAGMA COPPER COMPANY	Copper Creek	Sulfide			
	Kalamazoo & San Manuel	Sulfide	234 proved	0.72	Published 1983 E&MJ. International Directory.
		"	456 probable	0.70	
		Oxide	205 possible	0.70	
	Superior	Sulfide	3.3 proved	5.80	Published 1983 E&MJ. International Directory.
			1.1 probable	5.20	
			0.07 possible	4.70	
	Vekol Hills	Sulfide	105	0.56	Publ. 1978, minable by open pit; with 0.014% Mo; 16 million tons oxide Cu.
McALESTER FUEL CO.	Zonia	Oxide	20.5	0.53	Publ. in 1980 E&MJ International Directory.
NAVAJO TRIBE (?)	White Mesa	Oxide	2	0.75	Publ. 1955.
NORANDA LAKESHORE MINES INC.	Four Metals	Sulfide	3	0.82	Reported 1965
	Lakeshore	Sulfide (Porphry)	41	0.65	Published in Noranda's 1982 Annual Report
	Lakeshore	Sulfide (Tactite)	8.9	1.35	Published in Noranda's 1982 Annual Report
	Lakeshore	Oxide	15.0	1.18	Published in Noranda's 1982 Annual Report
	Ventura	Sulfide	6.3	0.26	Reported 1965; with 0.28% MoS_2.
ORACLE RIDGE MINING PARTNERS	Oracle Ridge	Mixed (?)	11	2.25	Reported 1977; with 0.64 oz. Ag/ton Publ. 1979.

TABLE XX (Cont.)

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
S.B. OWENS	Carlota	Oxide	4	0.85	Reported 1979
PHELPS DODGE CORPORATION	Copper Basin	Sulfide	175	0.55	Publ. 1974; minable by open pit with 0.02% Mo.
	Copper Queen	Mixed			
	Dos Pobres	Sulfide	400	0.72	Publ. 1977.
	Lavender	Sulfide			
	Metcalf	Sulfide	375.425	0.76	1982 Form 10-K Annual Report.
	Morenci	Sulfide	516.370	0.77	1982 Form 10-K Annual Report.
	New Cornelia	Sulfide	302.371	0.45	1982 Form 10-K Annual Report.
	Safford	Mixed	262.400	0.88	1982 Form 10-K Annual Report.
	United Verde	Sulfide			
	United Verde	Oxide			
RANCHERS EXPLORATION & DEVELOPMENT CO.	Bluebird	Oxide	65	0.53	Publ. in Ranchers' 1981 Annual Report.
V. B. SMITH ESTATE	Dynamite	Sulfide			
SQUAW PEAK MINING CO.	Squaw Peak	Sulfide	30	0.35	Unpublished estimate
STANDARD METALS CORP.	Antler	Sulfide	5.1	1.95	With 4.13% Zn, 0.94% Pb, & 1.05 oz Ag/ton. Publ. in 1978 Annual Report & Form 10-K.

TABLE XX (Cont.)

COPPER RESERVES IN ARIZONA 1/

COMPANY	DEPOSIT	MAJOR MINERAL TYPE	MILLIONS OF TONS	AVERAGE Cu CONTENT	REMARKS/SOURCE
STRONG & HARRIS	Strong & Harris	Mixed	60	0.60	Unpublished estimates with 0.70% Zn.
SUPERIOR OIL	Pine Flats	Sulfide	12	0.50	Unpublished estimate.
UNDETERMINED	Mineral Hill	Mixed			
UNION OIL	Turquoise	Oxide	10	0.50	Published 1975.
UNITED STATES GOVERNMENT	Park Hill	Mixed (?)	30	0.45	Unpublished estimate.
UNITED STATES GOVERNMENT & U.S. METALS CORP.	Apex	Mixed (?)			
VAN DYKE COPPER CO. & SHO-ME COPPER CO.	Van Dyke	Oxide	100	0.50	Published 1977.

1/ Reserves are given with a grade of average total copper content as of December 31, 1982, unless stated otherwise under "Remarks". As used in this table, reserves generally mean those estimated quantities of ore which, under presently and reasonably forseen technical and economic conditions may be profitably mined and sold or processed for the extraction of their constituent values.